OPTIMIZATION

# Net design a black art

**BY PAUL KORZENIOWSKI**
Senior Writer

When a company wants to add 100 terminals to its network, what's the best way to connect them to a host? When a user complains of poor response time, how can it be determined which piece of the network needs to be tuned?

In most companies, the procedures communications managers undertake to answer these network optimization questions resemble some black art. Sequestered in a remote corner of a company and armed with incantations passed down from his forefathers, a network designer mixes and matches a myriad of possible network configurations before opting for one model.

Models must then be tested by being installed. If users holler about slow response time, another design must be tried. If complaints are few, the design is blessed.

See **Model** page 6

DEREGULATION

# Illinois a reformed state

*Competition gets mixed user reaction.*

**BY MARGIE SEMILOF**
Senior Writer

*Second in a three-part series.*

When it comes to loosening local communications regulations, no state has moved as quickly or as thoroughly as Illinois. In one legislative push, the state passed an elaborate telecommunications bill that shifted most locally provided services to a system of cost-based pricing. The move is likely to reduce phone bills for most businesses, but some users dispute that claim, saying their phone bills have increased considerably since local deregulation took effect.

See **Illinois** page 7


# NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES VOLUME 3, NUMBER 11 MAY 19, 1986


COMPUTER INQUIRY III

# FCC hands down new industry rules

*Order dumps separate subsidiary strictures.*

**BY KARYL SCOTT**
Washington, D.C. Correspondent

WASHINGTON, D.C. — AT&T and the Bell operating companies will no longer have to establish separate subsidiaries to offer enhanced services as a result of the long-awaited Federal Communications Commission Third Computer Inquiry order handed down here last week.

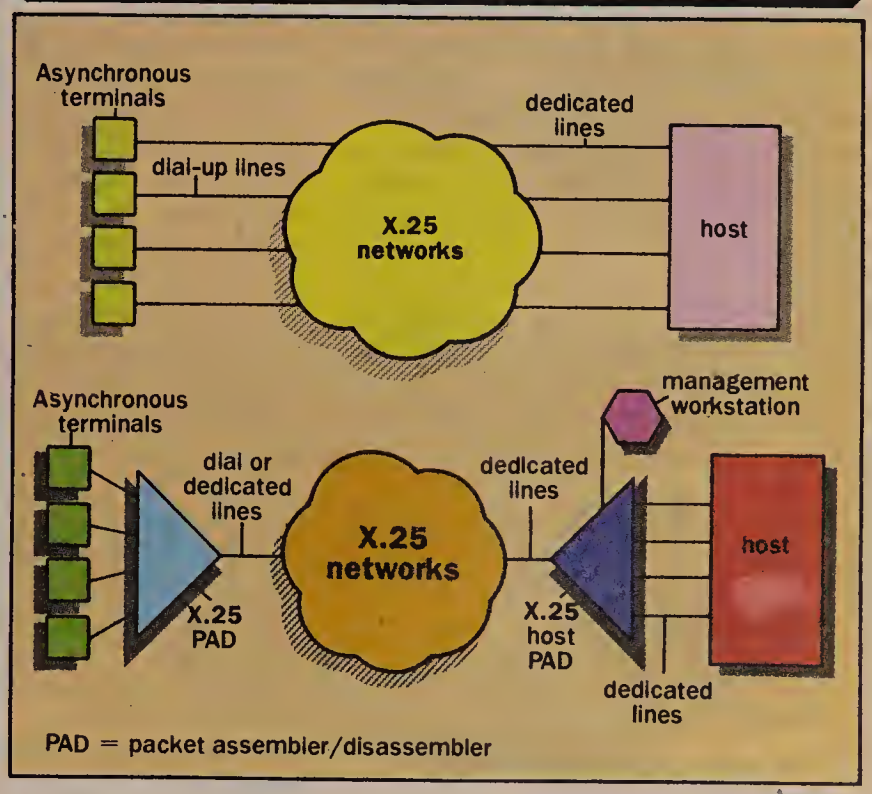
However, the Computer III decision did not abolish the FCC-imposed Second Computer Inquiry distinction between basic and enhanced services.

Ironically, even if the FCC had resolved both issues and established regulations allowing the BOCs to offer enhanced services, the companies would still be prevented from doing so by the Modified Final Judgment laid down by the U.S. Justice Department at the time of AT&T divestiture.

The Modified Final Judgment bars the BOCs from offering any enhanced telecommunications or information processing services. A clause within the Modified Final Judgment allows the BOCs to ask Justice to waive the rules in specific instances, although Justice has never granted a BOC enhanced services waiver request

See **Computer III** page 5

## Concentrating packet network traffic




PRODUCT FOCUS

# Padding the packet net

**BY JOHN DIX**
Senior Editor

Packet assembler/disassemblers (PAD) seem, on first blush, to be functionally straightforward and nondescript. But differences in the features, capabilities and management attributes of PADs clearly require close scrutiny.

PADs are concentration devices used with packet-switched networks.

They enable customers to save money

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## NETWORK LINE

### News

Speakers at the American Bankers Association meeting warn of the whipsaw effect of partial industry deregulation. Page 2.

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Comverse Technology introduces its Trilogue voice mail system that reportedly delivers information through voice prompts. Page 4.

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Sophisticated planners reject their soothsayer roles in new attempts at proactive network design and management. Page 6.

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Southern New England Telephone subsidiaries are slated to spring up after shareholders' approval of reorganization. Page 4.

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A new speech coder/decoder may prove to be of interest to thrifty users combining voice and data on a single line. Page 2.

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### Features

Wise local-area network buyers shouldn't sally forth without a tightly clutched shopping list in hand. Page 32.

## EXCLUSIVE

Next week, *Network World* will feature an interview with Terry R. Lautenbach, president of IBM's Communication Products Division. In his first major interview with a communications publication since becoming IBM's new "Mr. Telecom" last November, Lautenbach discusses a broad range of user concerns.

NEWSPAPER

▶ ABA CONFERENCE

# Banks in a state of flux

**BY JOHN DIX**
Senior Editor

NEW ORLEANS — The banking industry is relying heavily on communications technology to contend with the whipsaw effect of partial industry deregulation and increasing competition, according to speakers and attendees at the American Bankers Association (ABA) meeting held here last week.

Although communications was a common theme running through most of the seminars at this ABA National Operations and Automation Conference, only a handful of traditional communications vendors participated in the associated equipment exhibition. Few new communications-related products were unveiled (see "ABA POS study," page 5).

Products aside, there were plenty of industry developments to mull over at the three-day conference. Bankers are wrestling with multiple facets of change. Partial deregulation of the banking industry has made it possible for, and in some cases has forced, banks to merge. The logistics of merging communications and data processing systems has sapped bank resources at a time when new industry developments require careful attention.

Besides resulting in interstate bank mergers, relaxed regulations have encouraged branch office deployment. Other network-related developments in the last two years include the rapid acceptance of automated teller machines (ATM), increased use of point-of-sale (POS) credit and check authorization devices and new POS debit systems that enable stores to charge shoppers' bank accounts directly.

The advent of nontraditional competitors — principally retailers, manufacturers and other financial services providers — has lent a degree of urgency to bankers' plans. "There is no doubt in my mind that our new, nontraditional competitors, like Sears Roebuck & Co., American Express [Co., Inc.], General Motors [Corp.], General Electric [Co.] and Merrill Lynch, are picking up more of our customers than we are of theirs," said conference keynote speaker Richard Flamson. Flamson is chairman of the board and chief executive officer of Security Pacific Corp. and Security Pacific National Bank.

Bankers are looking to technology and further industry deregulation to help them compete. Chase Manhattan Bank NA, for example, spent $85 million for technology-oriented projects in 1985, according to Philip Giaquinto, a senior vice-president.

Further deregulation will bolster bankers' fortunes by enabling them

See **Flux** page 5

▶ USERS GROUPS

# MAP movement gains momentum

**BY BOB WALLACE**
Senior Writer

SEATTLE — A series of joint manufacturing automation protocol (MAP) development and marketing agreements highlighted the U.S. MAP/Technical and Office Protocol (TOP) users group meeting held here last week.

Industrial Networking, Inc. (INI), a Santa Clara, Calif.-based factory networking vendor, strengthened its position in the MAP-compatible products marketplace by inking a multiyear pact with Intel Corp. to distribute jointly individual components of INI's MAP/One local-area network equipment. Prior to the agreement, components of the MAP-compatible broadband local-area network were not available separately.

INI also signed a joint marketing and development agreement with Hewlett-Packard Co. involving the MAP/One local net. Hewlett-Packard will market INI's factory net and Ungermann-Bass, Inc.'s broadband Net/One office system to its computer customers. Dollar figures for the value of the two pacts were not divulged by company officials.

Sytek, Inc., Ungermann-Bass, Foxboro Corp. and International Computers Ltd. joined the rapidly growing list of equipment vendors that have pledged support for the MAP/TOP standards effort. More than a dozen factory equipment vendors participating in the show unveiled, or claimed to be developing, MAP-compatible products (see "MAP meet tools out," page 42).

Concord Data Systems, Inc., of Marlborough, Mass., bolstered its position in the international MAP product marketplace through an agreement with Omron Tateisi Electronics Co., a major supplier of programmable controllers in Japan, to develop MAP products jointly. This announcement came on the heels of a similar agreement reached with Siemens AG of West Germany [*Network World*, April 21].

Concord Data also announced it had successfully demonstrated interoperability between its Token/Net MAP products and Gould, Inc.'s MAP Gateway. Company officials said data was successfully transmitted from stations on a carrier band subnetwork operating at 5M bit/sec across the Gould MAP Gateway to stations connected to a Token/Net local net operating at 10M bit/sec.

INI also announced it had become the first factory systems vendor to have its networking software certified by the Industrial Technology Institute (ITI) as conforming with all seven layers of MAP specification version 2.1. The Ann Arbor, Mich.-based ITI tests

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PPG Industries of Pittsburgh paints by computers. **Page 35.**


▶ SPEECH DIGITIZER

# Entropic 8000 to debut

*Single-line voice/data capability offered.*

**BY MARY PETROSKY**
West Coast Correspondent

CUPERTINO, Calif. — A soon-to-be-announced speech coder/decoder that digitizes speech at a data rate of 4.8K bit/sec could prove a boon to users looking to save money by combining voice and data on one line.

Much of the success of Entropic Processing, Inc.'s Entropic 8000 coder/decoder will ultimately rest on how its voice quality compares with current analog line transmission quality. Company officials promise the voice quality of the Entropic 8000 coder/decoder will be comparable to that provided by long-distance carriers, and so far, prospective users are impressed with what they have seen. Rudy Prince, vice-president of marketing, said Entropic is aiming the product at companies with private networks, and it will be used for both domestic and international applications. It will officially debut at the upcoming ICA show.

Today, the standard voice digitization method used in telephony is pulse code modulation, which operates at 64K bit/sec.

By operating at such a low speed, the Entropic 8000 would enable users to multiplex several voice channels onto a single data line, providing an alternative to private, leased voice circuits. "We're allowing voice channels to fit into lower speed data networks," said company President John Burg. With the Entropic 8000, users would be able to fit more than 10 voice channels on a single 56K line, as well as enhance the use of T-1 lines, he said.

The Entropic 8000 could be used to provide secure voice transmissions, Burg said. Prior to founding Entropic in 1983, Burg was founder and chairman of Time and Space Processing, Inc., which markets low bit-rate voice digitizers primarily to the military for voice encryption applications.

Potential users are generally enthusiastic about the Entropic 8000, but are reserving judgment until

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▶ PRODUCT NEWS

# Saturn PBX Revamped

*Siemens tailors system for 40 to 144 lines.*

**BY SHARON SCULLY**
Senior Editor

BOCA RATON, Fla. — Siemens Information Systems, Inc. will introduce next month a redesigned version of it Saturn digital voice/data private branch exchange targeted at users with between 40 and 144 lines.

Standard features of the Saturn IIE include station message detail recording; call tracing; a voice mail interface compatible with Genesis Electronics Corp.'s, Octel Communications Corp.'s and VMX Inc.'s voice mail systems; least-cost routing and uniform call distribution. Optional features include automatic call distribution, a direct T-1 interface and transparent personal computer networking. The IIE also features a modular design that allows for expansion of up to 600 lines in a stack configuration.

Dietrich Arbenz, Siemens' vice-president of marketing and sales, told *Network World* last week the new product and the company's marketing strategy are aimed at reducing manufacturing costs and increasing its volume of U.S. sales.

"Siemens has realized that 50% of its accessible market worldwide is in the U.S.," Arbenz said. "The only way to increase share in the [customer premises equipment] market today is by increasing volume and reducing cost."

The company said the Saturn IIE is currently in field test at an undisclosed customer location and would be available through distributors next month. The product will be demonstrated at the upcoming International Communications Conference in Atlanta, the company said.

The parent company reported $22 billion in revenues last year to its shareholders, and has made clear its intentions to further penetrate the U.S. market.

Siemens Information Systems shipped some 200,000 PBX lines in the U.S. last year, Arbenz said. He claimed the company has a 5% share of the total U.S. PBX market, a figure that, while disputed by analysts, would put the company on par with ITT Business and Consumer Communications in Raleigh, N.C.

According to Spencer Rice of S & R Consulting, Inc. in Madison, N.J., the Saturn product line is "technologically good, but lacking good distribution." Siemens Information Systems sells only through distributors in the U.S., a policy the West German parent applies almost unilaterally to its U.S. operations.

The company's primary distributor is Telplus Communications of Long Island City, N.Y., a subsidiary of Telecom Plus International, Inc., in which Siemens invested $60 million last year. At the time of the investment, the companies formed a joint venture to market customer premises equipment, including not only Siemens equipment, but NEC Corp., Mitel Corp. and other PBX product lines already carried by Telecom Plus nationwide.

Siemens has not secured distribution through the regional BOCs, although recently it signed a joint marketing agreement with US West Information Systems in Denver, Colo., to jointly pursue the U.S. military market ["No Deal on EWSD," *Network World*, April 28]. Arbenz said the company is "constantly evaluating additional distributors." Other distribution channels the company sells through include Executone, Inc. in Atlanta, a subsidiary of Contel Corp., a number of independent interconnect contractors and telephone companies and seven wholesale outlets.

Arbenz said the company currently has no plans to introduce a higher line-size PBX in the U.S. However, some of the features of the Saturn IIE, including direct T-1 connectivity and shared tenant services software, are typically sold by other PBX vendors only to users requiring more than 600-line capacity.

▶ PRODUCT NEWS 2

# Voice mail unit unveiled

**BY JOHN DIX**
Senior Editor

WOODBURY, N.Y. — Comverse Technology, Inc. last week unveiled a voice mail system called Trilogue that provides standard voice messaging features as well as the ability to automate switchboard operator functions, route calls or deliver information to users through a series of voice prompts and integrate the system with text message systems.

The device can be interfaced to any telephone system and integrated with many private branch exchanges, including Northern Telecom, Inc.'s SL-100, NEC America, Inc.'s Neax 2400, Rolm Corp.'s CBX, and AT&T Information Systems' System 75 and older AT&T Dimension switches. PBX integration provides two features simple interfacing cannot: the ability for users to forward calls to a voice mail box and the ability to notify users of message delivery.

Trilogue can be upgraded within the same cabinet from its base configuration of four ports and eight hours of voice storage to 32 ports and 70 hours of storage. Prices range from $35,000 to $185,000.

Trilogue, when used in a standard voice mail application — functionally similar to putting telephone answering machines on users' desks and making it possible to forward those messages — Trilogue affords users the usual ability to personalize messages for their mailboxes. The device goes beyond convention by enabling users to pause, change the speed of, reverse and edit messages. Through support of a headset and foot-pedal option, Trilogue can be used as a centralized dictation system, according to Brian Wiltshire, the president of Comverse, which is

See **Voice** page 8

▶ INDUSTRY MOVES

# Shareholders OK Snet reshuffle

**BY SHARON SCULLY**
Senior Editor

NEW HAVEN, Conn. — Southern New England Telephone Co. (Snet) last week said its shareholders have approved the company's plan to reorganize the telephone company and five unregulated subsidiaries into a holding company structure.

Under the new structure, the parent company — to be named Southern New England Telecommunications Co. — would be comprised of one telephone company and nine unregulated subsidiary companies.

The subsidiary businesses will include customer premises equipment, cellular telephone and mobile radio, a national fiber-optic network, a financing company and real estate holdings.

The company originally submitted its plan of reorganization to the Connecticut Department of Public Utility Control (DPUC) last year, but the plan was not approved until early December.

Snet, in which AT&T once had an equity interest, is one of the last of the former Bell system affiliates to reorganize in a holding company structure.

Under the new structure, the parent company will be able to issue stock and conduct other business activities without first winning DPUC approval.

Also under the new structure, only the company's operating telephone company would be regulated by the state.

See **Snet** page 8

NETWORK WORLD

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"ABC membership applied for"

▶ AMERICAN BANKERS ASSOCIATION

# ABA POS study due out

*New point-of-sale debit nets would enable shoppers to have bills deducted directly from their bank accounts.*

**BY JOHN DIX**
Senior Editor

NEW ORLEANS — An ad hoc committee of the American Bankers Association (ABA) formed to draft standards for new point-of-sale (POS) debit cards will release its findings in July, attendees of the ABA conference were told here last week.

The Retail Payment Systems Task Force was formed last June and released its first report last October. That report dealt primarily with principles and goals of POS debit systems, according to William H. Petrarca, vice-president of National City Bank in Cleveland. Petrarca is one of two bankers representing the ABA on the committee. The July report will delve into system design specifics.

POS debit systems would enable shoppers to use debit cards in stores instead of checks or cash. Transactions would be deducted from the customer's bank account directly from the point of sale.

The task force is made up of four national bank card network operators, including Cirrus System, Inc., Plus, Visa and Mastercard. The goal of bringing these companies together was to represent the largest percentage of banks, while limiting the number of committee participants, Petrarca said.

Most banks are Mastercard or Visa representatives, and Cirrus and Plus operate national automated teller machine (ATM) networks. Cirrus and Plus are so-called networks of networks, national backbones interconnecting regional ATM networks.

According to Jay Levy, director of systems and operations with Cirrus and a task force committee member, Cirrus operates in 49 states and Canada and represents 11,000 ATMs. Plus is said to operate an additional 5,000 ATMs nationwide. The standards document, due in July, will be a system cookbook detailing specifications such as message formats, personal identification numbers (PIN), PIN encryption and even legal liabilities, Petrarca said.

A few regional banks in Florida, Ohio and California are said to be testing POS debit cards through enhanced ATM networks. ATM nets, which typically consist of multidrop leased lines, have to be upgraded with protocol converters for POS debit systems, an upgrade that is less significant than host software changes required at each bank.

How users and merchants will embrace the concept of POS debit cards is still an unknown.

Given the current acceptance of ATMs, however, most industry watchers say they expect POS debit systems to become the next wave of change.

▶ INFO CONFERENCE

# Hidden costs sully LANs

**BY MARY PETROSKY**
West Coast Correspondent

LOS ANGELES — Significant, but generally overlooked overhead costs make it unwise to buy personal computer local-area networks simply to share peripherals, speakers told attendees of the Information Management Exposition & Conference here last week.

Users often fail to calculate accurately the cost of maintaining a local net before purchasing one, said David Ferris, chairman and chief executive officer of Ferrin Corp., a San Francisco-based consulting firm.

Installing a network is comparable to putting in a minicomputer, Ferris said. In addition to data management issues that must be handled, users incur the costs of regularly fine-tuning the network and adapting single-user applications to a multiuser environment.

To date, vendors have told users they can cost-justify networks on the basis of sharing peripherals alone, but that is a fallacious argument, Ferris contended.

"In the corporate market, most of the local-area networks installed in the last three years are an absolute waste," Ferris later told *Network World*. He pointed to the sharing of information, particularly data bases, as the key justification for getting a network.

On the micro-to-mainframe front, Donald Wszolek of Information Builders, Inc. believes users are confused by the types of products available. He estimates that no more than 25% to 35% of micro users have a legitimate need to access mainframe data, and he said he doesn't expect that figure to grow substantially in the near future.

Security is a major issue in bringing corporate data down to micros. "Security on [personal computers] barely exists," Ferris said, adding that this lack of security makes corporate data vulnerable.

In addition, micro-to-mainframe links aren't particularly easy to use, and they may be costly, said Christopher Yalonis, president of the Jupiter Group, a management consulting firm based in Sausalito, Calif.

**Flux** from **page 2**

to diversify. "Banking must be permitted to grow into the areas of real estate, insurance and securities," Donald Senterfitt said in a conference welcoming address. Senterfitt is president of the ABA and vice-chairman of Suntrust Banks, Inc. in Orlando, Fla.

Communications technology is at the root of present services and provides a base from which banks can attack the new markets. According to Rick Higgins, executive vice-president of First Interstate Services Co. in Torrance, Calif., banks are increasingly dependent on communications delivery systems. All branch offices, ATMs and POS terminals rely on complex communications networks, as will many new banking services.

Higgins said most banks are between the second and third phase of a four-phase communications strategy evolution. Having initiated a strategy in the first phase, most banks are now formally addressing cost containment and trying to reduce the network to a utility status in the second phase.

Some banks have reached the third phase, where the telecommunications department becomes a company within a company, with the charter to explore new ways to exploit communications for competitive gain. Few banks have entered the fourth phase, Higgins said, in which the network becomes a revenue producer.

Some big banks are adopting strict network architectures to help contend with an ever-growing number of diverse computer systems and networks. According to Peter Lacovara, a vice-president with Chase Manhattan, his company has equipment from several manufacturers running various operating systems on up to 50 separate networks.

In an effort to control this chaotic environment, Chase Manhattan is in the process of establishing the Chase Systems Architecture, a set of rules governing how systems are to be structured, Lacovara said. The architecture will have three major components: communications, applications and data, each to be explored by a separate committee.

For communications, the network component, Chase Manhattan is adopting the International Standards Organization's Open Systems Interconnect network model. The applications committee is defining standards for micro-to-mainframe communications, electronic mail and other items, while the data committee is addressing data management and data element specifications.

**Computer III** from **page 1**

The FCC, the BOCs, AT&T and the Justice Department refused to comment in detail on the order until it is officially issued and goes into effect, which will probably happen in about a month.

But in issuing the order eliminating the need for separate subsidiaries, the FCC stated that the existing regulations were hindering competition and innovation. "The commission has concluded that the record in the Computer Inquiry III proceedings strongly supports a finding that the inefficiencies and other costs to the public associated with the structural separation requirements for the provision of enhanced services substantially outweigh the benefits. Accordingly, it has removed those requirements from AT&T and the Bell operating companies, subject to their compliance with nonstructural safeguards," the FCC commissioner said.

Reaction to the order was mixed, with various sources claiming it was a great victory and a harrowing defeat for users.

While pleased with the order, AT&T said some of the new requirements could delay the introduction of new services to customers, because there is a considerable amount of time required to file the necessary accounting and technical information and wait through a public comment period.

Nynex Corp. was pleased with the FCC action, saying consumers are the clear winners because the order will bring new technologies within their reach. Elimination of the separate subsidiary requirement will speed the delivery of new services because they will be developed and marketed from one central company.

On the negative side, the North American Telecommunications Association (Nata) said the order would hurt telecommunications users because its proposed accounting measures — designed to monitor cross-subsidization of unregulated services through funds from regulated services — are insufficient.

"The FCC thumbed its nose at U.S. consumers," said Edwin Spievack, Nata president. "The FCC has enacted phantom safeguards that will result in higher local rates and decreased competition."

The FCC also issued a Supplemental Notice, which covers nonstructural safeguards. The accounting measures condemned by Spievack comprise one such group of safeguards. Others include open network architecture plans, comparably efficient interconnection requirements, network information disclosure and customer proprietary network information.

The open network architecture plan must be submitted by February 1988. This is subject to FCC approval and public comment. This plan requires the BOCs and AT&T to unbundle network elements such as transmission, protocol conversion and packet switching so they can be sold to competitors at the same tariff rate at which the companies supply those elements to themselves.

▶ NETWORK OPTIMIZATION

# Designers shun knee-jerk blueprints

*Sophisticated planners retire crystal balls and magic wands.*

**BY PAUL KORZENIOWSKI**
Senior Writer

Communications managers are attempting to take a proactive, rather than the traditional reactive, approach to network design.

However, before a designer can sketch a flexible, efficient network blueprint, the designer must know how the network will evolve. In most companies, determining how the network is presently operating and how it will change is as difficult as deciding how best to allocate network resources.

Managers say users are a principal roadblock to accurate network design. They typically expect terminals to be sitting on their desk soon after the ink on terminal requisition forms has dried. In many instances, network engineers can fufill this expectation.

However, constantly acquiescing to users' wishes can create problems.

"The biggest problem we face is not from large, unexpected requests but from small, repeated requests," noted Ken Hildebrand, supervisor of computer operations at Tosco Corp., a Bakersfield, Calif., oil company.

"Two or three terminals at one location can quickly turn into 15 or 20 terminals at the site. Sometimes, we may not have enough lines or ports to support that many."

Companies are attempting to alleviate this problem by requiring users to estimate network requirements and submit the projections to the network design group. This step can supply some relief to network designers, but it is not foolproof.

If history is any guide, users supply inaccurate estimates. "We've had some estimates that were off by a factor of two," said one communications manager. "So of course there were response problems. The network was not designed to handle as many terminals as the department installed."

The most common problem managers face is determining the proper resources with which to support new applications.

"As users work with an application, they discover more and more ways of using it," noted David Fenstemaker, assistant vice-president at First Interstate Bancorp. in Torrance, Calif.

"Actual traffic may vary greatly from the figures used in a pilot program."

. One communications manager asked a department head to estimate how much information each screen in an interactive application would transmit. The department manager said that data would be sent in 50- to 100-byte blocks.

When the application was installed, response time problems occurred. The communications manager discovered that 2,000-byte blocks were being sent.

"Unfortunately, this situation is a common one," the manager said. "I'm not sure how to solve it."

**Model** from **page 1**

Because networks have increased in complexity, cost and importance, large corporations are searching for a proven methodology to replace the black art. Guesswork is being replaced by network modeling tools, software packages that run on a variety of computer systems.

"We could not afford to take down the network and test our design every time we made a change," said David Fenstemaker, assistant vice-president at First Interstate Bancorp. in Torrance, Calif. "We needed a tool that would enable us to examine the impact of changes before they were implemented."

Network modeling tools work somewhat like spreadsheets. Designers enter configuration information, such as the number of lines in a network, the type of lines, line transmission speeds, the number of controllers and terminal mix. The software enables designers to ask "what if" questions, such as, "What will happen to response time if we replace five point-to-point lines with a multidrop line?"

Before the advent of these packages, few network design tools were available. Many companies relied on homegrown software. After developing network modeling tools for internal use, AT&T and IBM made their packages available as a service to their customers.

IBM has supplied its customers with a free service called System Network Analysis Program/Simulated Host Overview Technique (Snap/Shot). To use the service, customers travel to IBM's communications research facility in Raleigh, N.C. There, they load network design data onto one of the mainframes at the research facility, and the Snap/Shot service generates a network configuration model that identifies areas where the network is overloaded.

Several managers said they like Snap/Shot, but they said making use of the service involves a number of compromises.

Many users said that traveling to Raleigh is more than a minor inconvenience. Before the trip, users have to collect network performance data, a time-consuming and often confusing process. In Raleigh, users may spend two or three days loading the performance data. If a question arises when Snap/Shot is run, information needed to resolve the difficulty often is at the customer's site, not in Raleigh. Also, Snap/Shot sessions are backlogged and have to be scheduled six months in advance.

Limitations with tools like Snap/Shot have forced customers to purchase their own network modeling tools. BGS Systems, Inc. of Waltham, Mass.; Contel Information Systems in Great Neck, N.Y.; Boole and Babbage, Inc. in Sunnyvale, Calif.; and ACK Computer Applications, Inc. in Raleigh, N.C,. are a few of the companies that supply network modeling tools.

Even though communications managers have displayed a great deal of interest in these packages, the products are not panaceas. First, the packages are expensive, ranging in price from $4,000 to $400,000.

Second, they supply only pieces of the network design puzzle. Some modeling packages are appropriate for measuring network costs. For example, the packages will illustrate the cheapest way for a company to link remote users to a host.

Other packages are used to model network performance, analyzing, for example, how installation of a multidrop line will affect terminal response time. Users said that no current offering completely integrates both functions.

In addition, the latter class of packages is usually handicapped by limited flexibility. Most network performance modeling packages can supply a model for a fairly simple Systems Network Architecture network using IBM 3274 controllers. However, companies that need such modeling packages typically operate complex networks supporting a variety of equipment, much of which cannot be included in a model.

Cross-domain networking, which involves the connection of a variety of hosts on a single network, raises performance issues not encountered in simple SNA networks. For example, in a cross-domain network, some front-end processors take on gateway responsibilities in addition to their traditional communications chores. Most models are not flexible enough to gauge how that additional usage could impact network performance.

Another problem involves entering proper performance data into the model. Some models use best-guess estimates as input. Others require that a user run a diagnostic facility, such as an IBM Vtam trace, during network operation. Information from a trace can then be loaded into a model. Running a trace eats up a great deal of central processing power and slows system response time, so network designers are reluctant to run them.

The tools also require a great deal of training. Typically, a skilled network engineer would need to spend at least two weeks with a package before becoming versed in its capabilities.

▶ TANDEM

# OSI tool out

*Software serves as Layer 4 interface.*

**BY MARY PETROSKY**
West Coast Correspondent

CUPERTINO, Calif. — Eager to back its commitment to communications users with actual products, Tandem Computers, Inc. is expected to announce today the first in a planned series of data communications products based on the International Standards Organization's seven-layer Open Systems Interconnect (OSI) model.

Tandem's OSI4AM software is designed to help users build communications interfaces for connecting a variety of computer equipment in an X.25 wide-area network, according to Andy Poupart, OSI product manager. X.25 packet-switched networks already support the lower three layers of the OSI model, Poupart said.

OSI4AM implements the fourth layer, also known as the transport layer, which handles end-to-end communications across the various subnetworks that may connect a sender and receiver, Poupart explained.

"Almost every computer vendor is developing OSI products. It's one of the fundamental things you have to provide," Poupart said. "In a year or two, there will be a large range of products available," he added. Digital Equipment Corp. already offers compatibility with the first four layers of the OSI model.

**A base for OSI products**

Poupart admitted that OSI4AM may be of limited utility now, but stressed that Tandem would use it as a base from which to develop other OSI products, including those that address the upper layers of the OSI model.

"OSI4AM is not a complete OSI product; it's a positioning product," he said.

Currently, it can be used to relieve applications of some of the communications burden, Poupart said. For example, users looking to share files among machines via an X.25 network could use OSI4AM to write fairly simple file transfer software.

Users today generally write custom communications software for each set of dissimilar computers they wish to connect, Poupart added.

In April, the company introduced the Nonstop VLX, a high-end transaction processing system that company officials said was designed to serve as a host for telecommunications and messaging applications.

OSI4AM is priced at $750 for an initial license fee, with a $150 monthly license fee per system for Nonstop II, Nonstop TXP and Nonstop VLX systems. The price is $375 for an initial license fee and $75 in monthly fees for the Nonstop EXT systems.

**Illinois** from **page 1**

Illinois embraced competition in the communications business before any other state. In fact, it has the distinction of being the only state to voice approval when the U.S. Department of Justice announced in 1982 its plan to divest AT&T. A feisty Illinois Commerce Commission (ICC), led by then-Chairman Michael Hasten, drew up its own five-year plan to restructure the local communications business. By 1982, legislative proposals that developed a framework for transferring non-traffic-sensitive costs to end users were prepared.

The maverick ICC members demanded to be involved in the Justice Department's plans to restructure the industry, specifically the process of determining territories called local access and transport areas. Illinois is the only state that divides Latas into so-called market service areas (MSA). The state officially was assigned five Latas, but subdivided them into 18 MSAs. Each MSA is assigned a primary carrier to coordinate the local toll network.

Illinois also allows all carriers to declare their services competitive. As a result, those services are removed from rate regulation, provided there is an equivalent service offered in an MSA. Shared tenant providers and coin phone vendors are exempt from regulation, and AT&T can sell the bulk of its services without rate restriction.

In addition, the value of the state's installed base of equipment was depreciated immediately after divestiture, rather than gradually, as in most other states. According to Mark Fornier, a telecommunications analyst for the ICC, depreciation could conceivably result in higher rates for customers over a short period of time.

Rates were also de-averaged, or determined based on actual cost according to geographic density. This month, local carriers will also begin to de-average intrastate MSA tolls and restructure the local rates charged to subscribers within Chicago.

Rate de-averaging, which produces higher phone costs for rural customers, spurred a booming bypass industry in less populated sectors of the state. The bypass industry has the full support of ICC officials, who believe the increased competition will drive phone rates lower.

According to Kale Case, director of the telecommunications division of the ICC, some large users in rural areas fought the bill at first. But the actual number of complaints was surprisingly low.

"Customers don't complain now because the plan is working," Case said.

However, not all users share Case's enthusiasm for the deregulatory effort. One communications manager for a Chicago university said some line costs have increased as much as 300% since state deregulatory efforts began. "The commission did not know what the aftereffect of deregulation would be," she said.

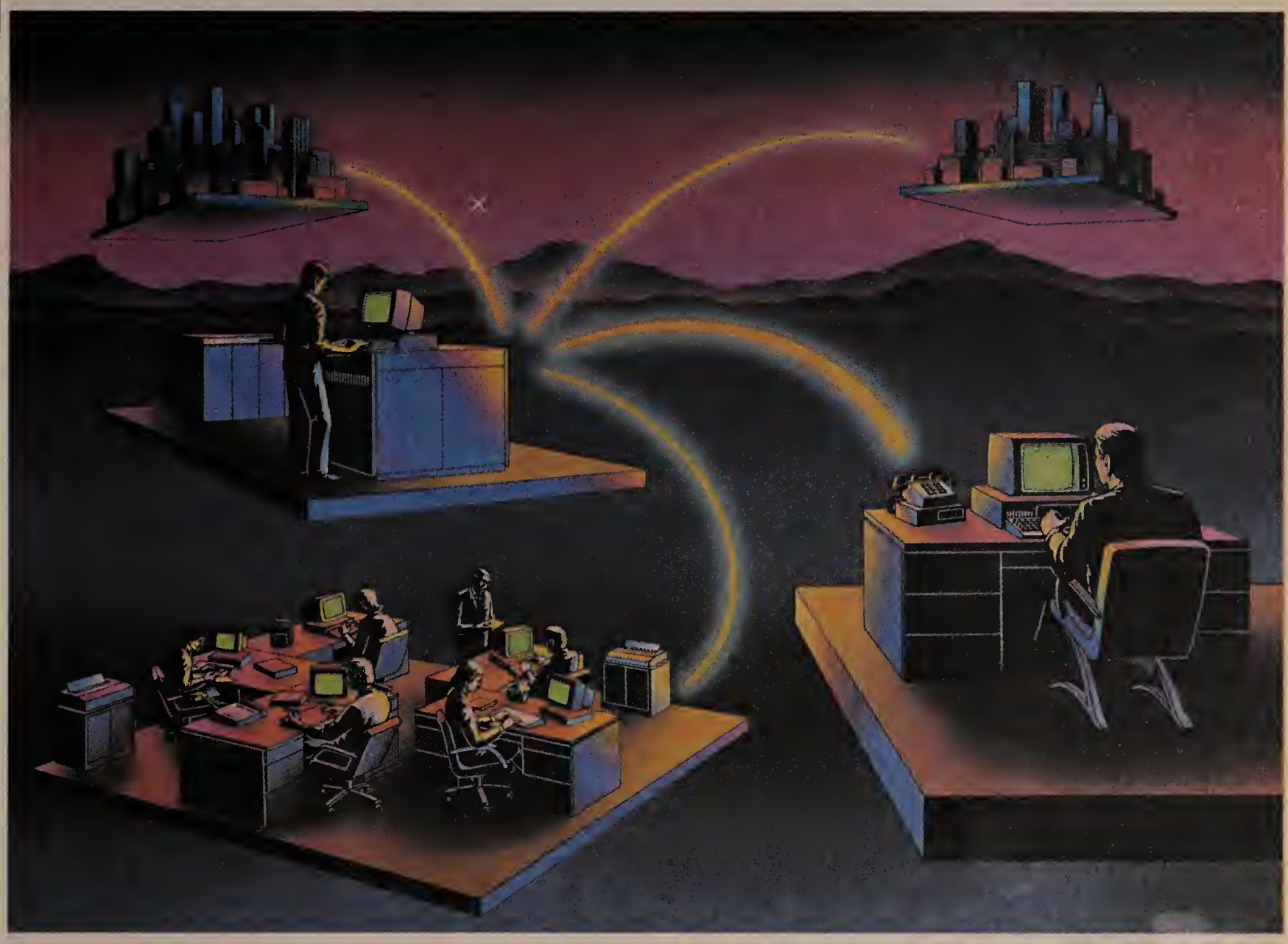
Russ Burnett, technical advisor for Wallace Computer Services, Inc., said his firm's phone bill increased some 20% since local deregulation.

"The public utilities commission can say costs will drop, but they're not the ones paying the bills," he said.

Officials at the ICC shun the term deregulation, preferring to call their efforts a relaxing of regulatory influence. Case also said it is wrong to think there will be total deregulation in any state.

"There will always be some local services that are regulated," he said. "The companies are still regulated to some degree. We determine which areas they serve and what will happen if they abandon service. If push comes to shove, we will regulate local rates. But for the most part, we are letting the market forces carry the game."

*Next week, Iowa's deregulatory battle.*

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**Voice** from **page 4**
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The Trilogue dialogue generator, Genlogue, is used to create the voice prompts and routing instructions that, when illustrated, follow a branching-tree topology. The application is created using a telephone and simple screen entries.

Trilogue can be integrated with text message systems through an RS-232 port using an application product called Textlogue. Textlogue enables text message systems to notify users of voice messages and vice versa. In a later release, it will be possible to call and have Trilogue read text messages through voice synthesis, Wilthsire said.

Comverse has installed 15 Trilogue systems. The company is a wholly owned subsidiary of Efrat Future Technology, Ltd. in Tel Aviv, Israel.





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**Snet** from **page 4**
According to Mike McCann, a spokesman for Snet, intra-Lata competition would not be detrimental to the company.

"We would drop our prices in order to compete, and I think we could compete very well if that's to be the playing field," he said. "But we see it more as a question of public interest than a business issue. It's going to affect virtually all of our customers by raising their rates."

According to Neil Yelsey, an analyst with the New York-based Salomon Brothers, the restructuring is designed to give the company more flexibility. "They want to be a holding company because, like any independent telephone company, the structure will allow Snet to separate its operations and ensure, for the FCC's purposes, that there is no cross-subsidy between regulated and unregulated operations," Yelsey said. He added that, under the new structure, the company would not be required to report all its financial results to the FCC, but only its telephone network service revenues.

Yelsey said Snet has not been "buffeted by factors affecting the Bell regionals, but by the factors affecting all the independent telcos." Specifically, he said Snet's biggest problem, and the reason why its revenues are down, is because its embedded customer premises equipment base is eroding.

According to the terms governing divestiture, the embedded customer premises equipment base of the former Bell System, estimated by analysts at anywhere from $5 billion to $10 billion, was transferred to AT&T Information Systems at the time of divestiture.

Consequently, the loss of lease and rental fees on this embedded customer premises equipment has not affected telephone service earnings of the seven regional BOCs. Analysts note it has negatively impacted AT&T Information Systems, which has lost money as a result of the divestiture-spawned customer premises equipment shift.

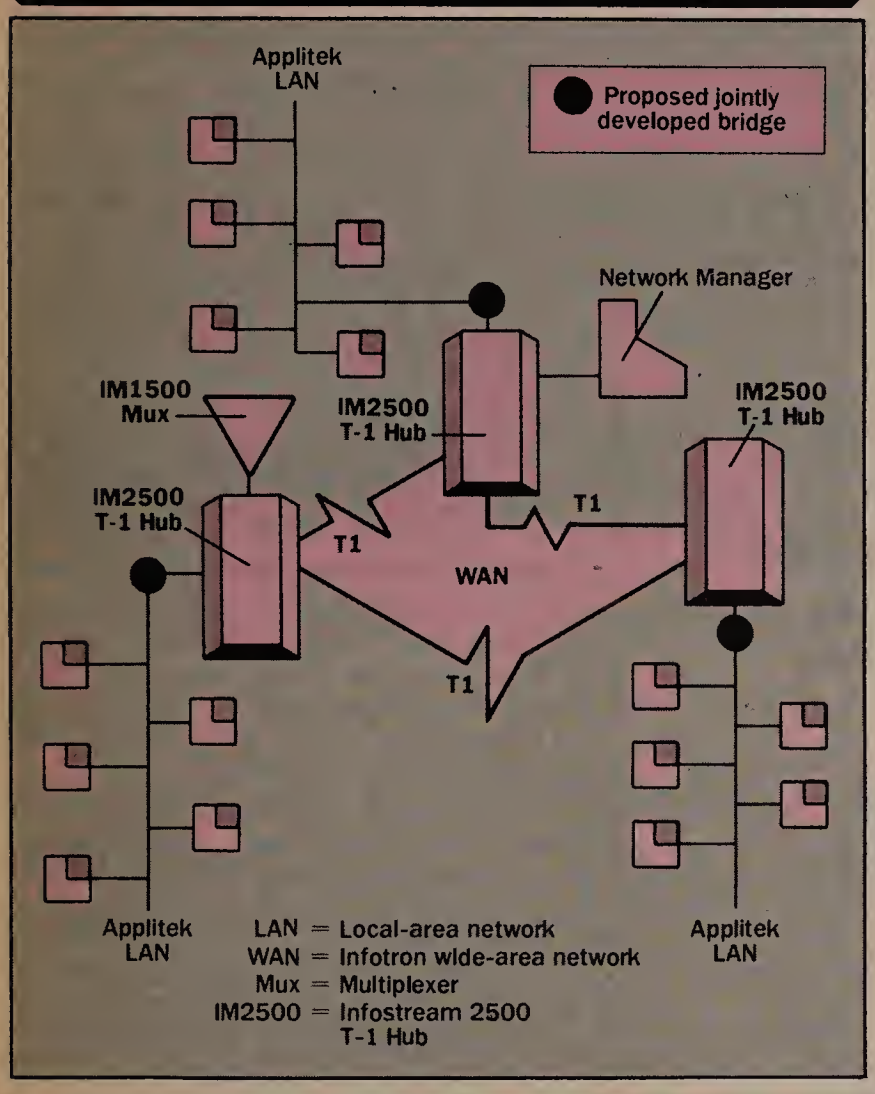
One result of the holding company structure will be to isolate Sonecor Systems, the company's customer premises equipment subsidiary, as a wholly owned separate subsidiary. As such, moves that company may make, such as acquiring or selling businesses, would not have to be reported in advance to the DPUC.

# INDUSTRY UPDATE

"As artificial intelligence, expert systems, sophisticated simulations and financial modeling come into wider play, they will increasingly force us to question the assumptions built right into their software. These techniques smack of objectivity. But smart decision makers know that total objectivity is impossible. And they will want to identify the biases that are hidden in the software design. In the future, the willingness of a company to level with its customers about the assumptions designed into its software will indicate how much trust it deserves.

**Alvin Toffler**
from a national print ad placed by First Chicago National Bank

**Proposed Infotron-Applitek integrated LAN-WAN network**




▶ INDUSTRY MOVES

# Infotron swallows local net firm

*Merger with Applitek aimed at blending local-, wide-area networking technologies, boosting stature in T-1 market.*

**BY MICHAEL FAHEY**
Staff Writer

CHERRY HILL, N.J. — Infotron Systems Corp. recently reached a preliminary $18.5 million agreement to merge Applitek Corp., a privately held local-area networking firm, and its wide-area networking business as a wholly owned subsidiary.

The merger is subject to approval by the board of directors of Infotron, which went public in 1984, and the few equity shareholders in the Wakefield, Mass.-based Applitek. The deal is expected to be consummated in two months, according to officials of the companies.

Infotron, based here, manufactures a range of wide-area networking products, including statistical and T-1 multiplexers, data private branch exchanges, matrix switches and the recently introduced T-1 networking hub. Applitek, which will remain in Wakefield, makes broadband and baseband fiber-optic local network products, including terminal servers, bridges, gateways and network management systems.

Observers said the alignment would give both companies an advantage in the T-1 private network market — now considered to be one of the fastest growing segments of the data communications industry.

Infotron entered the T-1 multiplexer market with Infostream, a software-driven multiplexer that supports as many as 128 voice and data channels and can be integrated with the company's IS4000 intelligent switching system to provide multiple-node networking at T-1 rates. Infotron's 990 Network Processor incorporates switching, automatic alternate routing and reconfiguration.

The company is seen by analysts as a leader in large private circuit-switched networks based on its statistical multiplexer line. The company's product strategy, called Advanced Network Integration, is aimed at providing product compatibility, extensive diagnosis capabilities and centralized management of integrated data communications networks.

Infotron spokesman Barry Cress said the ability to offer end-to-end connectivity by incorporating Applitek local networking technology was the primary force behind the Applitek merger.

Earlier this year, Infotron acquired a minority interest in Transfer Technologies Corp., a micro-to-mainframe communications vendor. It has also invested in Network Switching Systems, a company that is developing a wide-area digital switching system.

Applitek products support customer premises devices from nonintelligent terminals to personal computers, workstations and host computers at speeds up to 10M bit/sec. Its local networks support terminals, bridges for T-1 connections, gateways and high-speed host networks compatible with IBM, Burroughs Corp., Digital Equipment Corp., Sperry Corp., Honeywell, Inc., Data General Corp. and Apollo Computer, Inc. computers.

See **Infotron** page 10

VENDOR VIEW
**MARK DAVIES**

# A new age of open access

The Third Computer Inquiry has the potential to revolutionize the communications industry by promoting an open architecture that would standardize protocols and network access into the phone system. This would create an extremely flexible and innovative communications infrastructure for the U.S.

Computer III, however, also raises several serious issues. One important question is how the Federal Communications Commission will be able to promote a competitive market while allowing AT&T and the Bell operating companies to sell enhanced services. One proposed solution is Comparably Efficient Interconnection (CEI).

Simply stated, CEI requires AT&T and the BOCs to provide high-quality network access to other enhanced-service vendors. This network access must be comparable in quality, functionality and cost to that which AT&T offers its own customers.

The industry, outside of AT&T and the BOCs, is pushing for access that is not only comparable but identical, wherever feasible.

The implications are significant both to the end user and the vendor. In essence, CEI promotes an open architecture for communications, an architecture that clearly defines network access and accompanying protocols. An open architecture could lead to an entire restructuring of the telephone network itself.

Just as technology in the computer industry has driven data processing from centralized to distributed, the same trend is occurring in communications. This trend may manifest itself in several ways. By distributing intelligence incrementally throughout the network instead of embedding it within the phone system, the system would have built-in flexibility to accommodate new services.

End users would be able to structure their own subnetworks to suit their needs and still have the assurance of a more efficient, integrated interface with larger networks.

Vendors and end users could both access the dominant carrier network and utilize it as a custom piece of their own subnetworks. Ultimately, end users would have more control over their own networks, and vendors could respond quickly with technological advances. And, since the dominant carriers could also offer new enhanced services, they would stand to gain as well.

Not only could the concept of CEI put us far ahead of our foreign competitors, it could create a much better infrastructure for the U.S. than in

See **CEI** page 10

*Davies is vice-president, Wide Area Networking, Codex Corp., Mansfield, Mass.*

**Infotron** from **page 9**

Infotron and Applitek plan to integrate Infotron's wide-area network management capabilities with Applitek's local network management package, enabling users to combine management of multiple-facility local nets into a single management function. According to Infotron President James Hahn, this combination would provide large users with more efficient resource sharing and network management across both local- and wide-area networks.

Applitek President Ashraf Dahod said the companies would provide a gateway from local- to wide-area nets that would give network managers what appears to be an end-to-end net for intrafacility and wide-area communications.

The merger "will allow us to provide an integrated wide-area and local-area networking solution to communications problems," said Peter Gregory, vice-president of sales and marketing for Applitek.

Infotron's sales force will be trained to sell the Applitek product line, according to the companies. Initially, Applitek will be operated as a separate but wholly owned subsidiary of Infotron, with present management retaining oversight of the company.

According to David Barnhill, Infotron's chief financial officer, Infotron is committed to providing Applitek with as much as $2 million in working capital prior to the merger's closing date.

**CEI** from **page 9**

the past. While the RBOCs have argued that centralized processing is more efficient, there is little evidence to support that claim.

The approach of the RBOCs has been to place intelligence in the phone system itself, which severely constrains alternative technical approaches.

Inexpensive very large-scale integration technology has reduced the economy of large-scale central processors and opened up new technical avenues that allow either the phone company or the end user to control a part of the network.

The basic argument for a national communications system — compatibility, quality and knowing whom to turn to when something goes wrong — would be addressed through CEI. As integrated services digital networks become available, an open architecture for protocols and network access will permit operation between devices and will allow the user to manage and maintain the quality of the network. Instead of relying on the carrier or individual vendors to manage the network, customers would be able to control it themselves.

Collocation has been proposed as another means of fostering a competitive environment. However, it is being met with mixed reviews. Collocation would allow customers and vendors to put their own equipment in a central office, giving them the benefit of structuring their networks as they see fit, while avoiding the cost of unnecessary access lines.

If collocation is not feasible, the local operating company and the service provider would share the cost of moving customer transmission from the operating company's networking facilities to the provider's access node.

Provided there is sufficient space to accommodate collocation, this could result in decreased cost for vendors and customers alike. The carriers could benefit from lease arrangements, and they could potentially curb the incidence of bypass.

Not everyone is in favor, however, of entrusting their equipment to the care of a phone company. Collocation is simply one method of implementing CEI.

While there is widespread support for CEI, the basic question at hand is how it will be defined and utlimately implemented. At this point, AT&T is the only carrier that feels it should be exempt from CEI rulings. While the majority of the industry supports CEI conceptually, there are as many views of implementation as there are concerned carriers and vendors.

In order to implement CEI effectively, a great deal of work must be done. Many in the industry believe that CEI must first be concretely defined in terms of the technology involved.

Logically, the FCC would identify the types of technical parameters that need to be defined and then turn this task over to standards organizations. In turn, the FCC would monitor this process to ensure that these standards for open architecture achieve equal interconnection.

For CEI to work, the FCC must also establish a timetable for compliance. In all probability, this will come about through a separate notice of proposed rule making and may take two years or more to come to fruition.

If properly drafted, Computer III could certainly revolutionize the communications industry. An open architecture could bring about a world in which multivendor equipment and multiple technologies can not only coexist, but can communicate effectively. The result would be a flexible and innovative communications infrastructure that could easily accommodate user requirements for new services.


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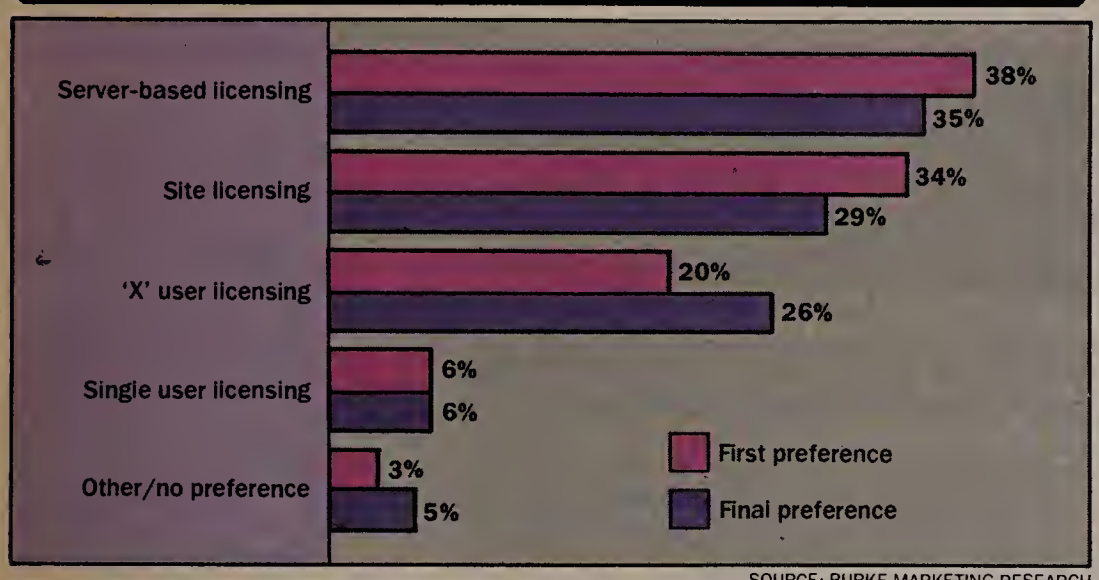
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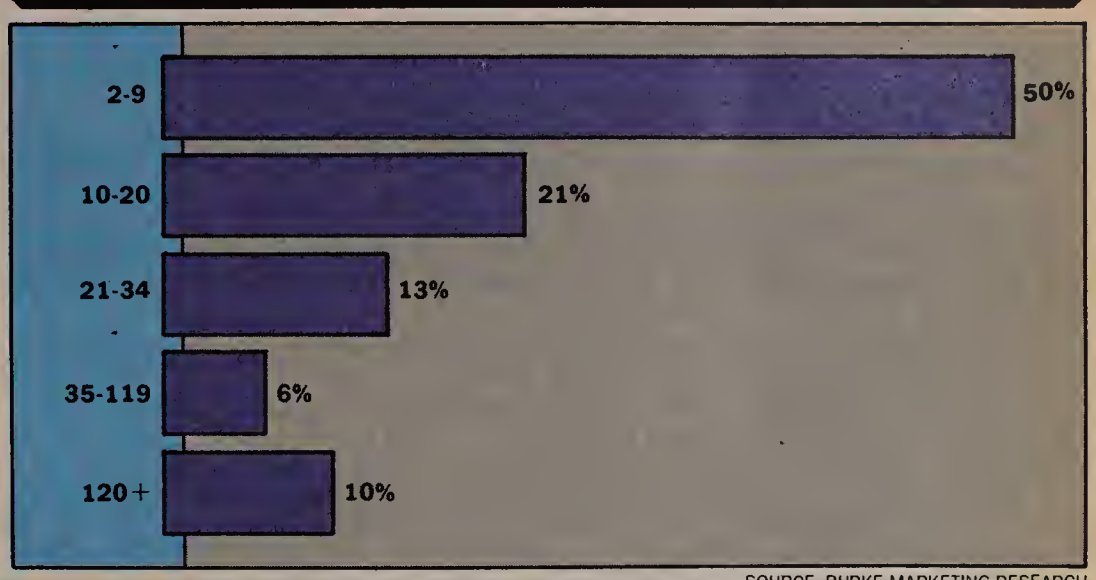
Interlink Business and Communications Services recently reduced its international message-switching service rates. The price of a one-minute message between the company's home state of Connecticut and Europe starts at 77 cents, compared with rates of the standard international records carriers, which can range up to $2.31 per minute.

### Preferred software licensing option




SOURCE: BURKE MARKETING RESEARCH

### Average number of PCs per LAN




SOURCE: BURKE MARKETING RESEARCH

CROSS TALK

**JOHN DIX**

# Local net battle rages

Pressure to incorporate token-ring networks like IBM's into the Technical & Office Protocol (TOP) specification is evidence that, standards or not, users recognize the importance of having local-area network alternatives within their communications architectures.

Certain factions within the TOP users group want to add support for IEEE 802.5 token-ring networks to the IEEE 802.3 Ethernet-type networks currently supported. The effort reflects the reality of networking today and is not a statement about the merits of one local network over the other.

TOP is a specification promulgated by Boeing Computer Services Co. and backed by other users that is intended to ratify portions of international office communications standards in an effort to speed their implementation. TOP is meant to do for the office what General Motors Corp.'s Manufacturing Automation Protocol (MAP) is intended to do for factory automation.

TOP and MAP are layered network architectures that share some common elements, such as the Layer 4 transport protocol, but differ at higher and lower levels to meet the particular needs of their intended environments.

The lowest two levels of MAP, for example, specify use of token-passing bus local networks. Token passing is good for factory applications because it can be used to determine network delays accurately. Delays are often intolerable on factory floors because of the stringent timing controls of production lines.

In its present form, TOP specifies use of baseband Ethernet networks. Unlike MAP, however, selection of Ethernet for the lower two levels of the TOP architecture was based on product availability and not so much on its technical capabilities.

With the advent of IBM's Token-Ring Network, the original decision is being reconsidered with an eye toward future product availability and implementation flexibility.

Only time will tell how Ethernet will fare against the Token Ring in the marketplace. However, working in IBM's favor is the use of telephone-type twisted-pair wire.

While one network may eventually enjoy more commercial success than the other, it should not come as a surprise that specifications like TOP have to make provisions for both.

True to their rank within all network architectures, the low-level transport functions provided by local networks will become more obscure with time. Eventually, local-area network interfaces may become standard options for computer products. Office network ports will be as prevalent as electrical outlets.

To be successful in this environment, TOP will have to sup-

See **Standards** page 12

▶ LOCAL NETS

# Users rate package deals

*Opinions revealed on license options.*

**BY JOHN DIX**
Senior Editor

The availability of innovative licensing options for software used on microcomputer local networks is high on the list of priorities for most users, according to a study recently commissioned by network maker 3Com Corp. The report states that the two licensing alternatives seen as most important by users are network-server and companywide site licenses.

User acceptance of local networks has been slower than anticipated, and the blame for this is often placed on the lack of multiuser software license options. Most software vendors still require users to buy one copy of their software for each user on a network, even if a single copy could be used to serve a multitude of users.

The 3Com study, prepared by Burke Marketing Research, was based on a telephone survey of 101 companies. Of these companies, 70 had installed local networks and the remainder were planning to install them within 12 months.

Companies queried ranged in size from small to large, some with as few as 20 personal computers and others with more than 500. On the average, the companies surveyed had 62 personal computers, four minicomputers and three mainframes.

An overwhelming majority of the users, 88%, said they believe standardized software pricing and licensing is important. But the majority of those respondents said they don't believe vendors are moving forward in resolving the issues.

Most users said they would prefer to pay one license fee per server, company site or specific number of users (see chart, above).

Server-based licensing, which allows users to share an application on a network disk, is the most sought-after licensing option. Site licenses, or blanket licenses for all company users at any given site, are a close second.

Software licenses for a limited number of users were seen as an attractive option by fewer respondents. Some users said they could live with single-user licenses.

Although still rare, licensing options are available from some companies. Microrim, Inc., for example, offers a server-based license for its R:base 5000 multiuser data base management system. The Business Library Corp. offers users of its business applications packages site licenses, and Ashton-Tate offers a licensing option based on a given number of users for dBase III Plus, its popular data base management system.

While the server-based option was mentioned as the preferred licensing method by companies across the board, companies with larger networks expressed more interest in site licensing, and compa-

See **Licensing** page 12

**Licensing** from **page 11**
nies with smaller nets rated highest the "X" user option, that is, the specified number of users option.

Survey respondents said they believe the licensing options will reduce the software price per user as the number of users increases. Given a benchmark of $100 for a single-user package, users said they would expect to pay, on the average, $301 for a license option that would support five concurrent users and $915 for an option to support 20 users.

More than 70% of the users queried said they did not want to assume the responsibility of policing software use. The majority of the companies claimed, however, to have a publicly stated software piracy policy.

**Standards** from **page 11**
port popular network products interchangeably. To that end, expect to see the users group also push to support AT&T's Information Systems Network.

Once local networks are truly relegated to a background issue, the more complicated tasks involved in building and operating multivendor networks can be fully addressed.

LOCAL NETS

# Novell reaches out

OREM, Utah — Novell, Inc. introduced a network service sharing system that allows users to link a Novell local-area network to as many as 12 remote asynchronous host systems or workstations. The firm also introduced a new version of its Advanced Netware network operating system that supports IBM's Token-Ring Network.

The Netware Asynchronous Communications Server includes as many as three wide-area networking interface modules (WNIM) that can be installed on a local-area network-connected IBM Personal Computer or Personal Computer AT. Each WNIM supports up to four asynchronous ports, allowing a fully configured system to support as many as 12 concurrent remote links operating at up to 19.2K bit/sec.

The Asynchronous Communications Server also includes Dynamic Microprocessor Associates' Ascom IV software, which supports data transfer between the host IBM Personal Computer and remote workstations through shared serial ports. The package supports modems manufactured by Hayes Microcomputer Products, Inc. and Racal-Vadic, a division of Racal Electronics PLC.

Netware's Anyware software supports all Netware functions for remotely connected workstations, making it seem as if the workstation is physically tied into the network. A local workstation anywhere on the network is dedicated for use by each remote workstation. Users are not required to download software to be used by the remote workstations.

A Netware Asynchronous Communications Server with a single four-port wide-area network interface module and Asynchronous Communications Server software lists for $1,490.

Novell also will release Version 2.0A of its Advanced Netware operating system, which adds IBM's Token-Ring Network to the list of networking hardware the package supports.

A Novell spokeswoman said Advanced Netware offers improved performance compared with the Token Ring's operating software, as well as increased connectivity to other networks. The software can be used on an IBM Personal Computer AT in 286 mode to provide more memory, disks and disk caching.

The Advanced Netware Version 2.0A lists for between $1,595 and $1,795. For users with Version 2.0, the upgrade to Version 2.0A will be free.


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# DATA DELIVERY

*Three user organizations joined the Corporation for Open Systems earlier this month. The addition of General Motors Corp., Citicorp and Dow Chemical Co. brought the organization's membership count up to 45.*

DATA DIALOGUE
**PAUL KORZENIOWSKI**

## Data delivery journal

**Debunking a myth.** Companies that specialize in network management will not realize the tremendous revenue growth that many industry analysts have forecast. Sure, companies would like to fine-tune their networks. Of course they would like to supply reliable end-to-end data transmission. However, current network management products supply only a fraction of the functions and features that users need. Some packages are great for ensuring communications line quality. Others are appropriate for measuring system performance.

No approach elegantly combines the two functions. No offering works with a variety of vendors' equipment. Supplying the functions that users desire in a multivendor environment is as complex as designing the International Standards Organization's Open Systems Interconnect model.

**Merrily rolling along.** IBM is expected to enhance its current network management offerings before the end of the year. Analysts expect IBM to establish a new de facto network management standard. Judging from IBM's track record, the new standard will be based on items that an engineer designed five years ago. I am constantly amazed at how IBM can lag behind many other companies from a technical standpoint yet still thoroughly dominate the industry.

**A kudo to Big Blue.** To give IBM its due, old line telephone managers think of IBM as one of their principal suppliers. The acquisition of Rolm Corp. and the investment in MCI Communications Corp. have supplied IBM with a presence in AT&T-dominated markets.

On the other hand, old-line data communications managers do not seem to be warming up to AT&T. Few are interested in the company's 3B line of minicomputers or its microcomputer line.

**Source of amazement.** A telecommunications manager at a large company asked a consultant what ISDN meant. A computer integrated manufacturing manager did not know what MAP stood for. I often wonder if writers and analysts

See **Journal** page 22

▶ OPEN SYSTEMS INTERCONNECT

# NBS to retain standards role

*Budget cuts, private sector work won't push agency out of the picture.*

**BY KARYL SCOTT**
Washington, D.C. Correspondent

GAITHERSBURG, Md. — Even though the National Bureau of Standards' (NBS) Open Systems Interconnect (OSI) Vendors Workshop has completed much of its work defining standards, the organization will continue to play an important role in the communications standards arena in the foreseeable future.

Observers had speculated that recent cuts in NBS' Institute of Computer Science and Technology budget, under which the workshop falls, indicated the government was gradually withdrawing from the standards-setting arena.

The OSI Vendors Workshop was formed in 1983 as a means of choosing implementations of established OSI standards. The group also develops test methods that can support those implementations and develops prototype products. The group has grown to more than 100 companies from the computer, telecommunications, factory control and semiconductor industries.

**A shift in responsibility**

The recent formation of the Corporation for Open Systems (COS) — a group composed of representatives from major computer and communications vendors and users groups — seemed to signal the shift of responsibility from the public to the private sector.

The observations were buttressed with statements from NBS officials. Deputy Director Raymond Kammer recently suggested the government would get out of the standards-setting business within a decade.

Despite the speculation, the NBS OSI agenda is full and is expected to remain that way for some years to come. One NBS official directly involved in the OSI Workshop pro-

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| Disoss support | | Advanced Program-to-Program Communications APPC | SNA Distribution Services Snads | Document Interchange Architecture DIA | Final form text Document Content Architecture FFT DCA | Revisable form text Document Content Architecture RFT DCA |
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| | 5520 | X | X | X | X | X |
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## IBM INSIGHTS

**Oops, forgot the hammer.** IBM continued to expand the options that a MIS manager could use for point-of-sale applications. Less than two weeks after announcing a new store controller and applications for supermarkets, Big Blue introduced a new operating system for its Series/1 minicomputer that would enable the device to support IBM 3651, 3684 and 4680 control units.

These control units can be used in a store to collect data that can be sent to a larger system for processing. As processing prices decline, retail chains are looking to automation to cut operating costs.

**Filling out the flip side.** IBM must be paying a lot of attention to the telecommunications side of its business, for a number of rumors are being whispered in analysts' ears. Big Blue is reportedly out to buy a central office switch manufacturer. Seems that blue pinstriped salesmen would like to have

See **IBM** page 22

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have created their own universe that only vaguely resembles the real world. For those not in the know, ISDN translates into integrated services digital network and MAP into Manufacturing Automation Protocol.

**Dumb move.** I was tempted to purchase Digital Equipment Corp.'s stock when it bottomed out last year. The stock's value has more than doubled in that time, which means I would have been able to quit my job and spend my time drinking Pina Coladas on some tropical island. My reasons were completely wrong. I thought the company would be an AT&T subsidiary by now.

**Some advice.** Employees at protocol converter companies should start brushing up their resumes. Very tough times are ahead for these companies. Protocol converters were needed 10 years ago. They've since been replaced by boards that can be directly attached to processors.

**Definition.** User friendly means your mother can easily use the device. A multiplexer manufacturer visited our office and labeled its new modular device user friendly. Then, a company spokesman pulled out a screw driver, unfastened pieces of the device and put in new processor boards. Picturing my mother trying the same process, I was overcome with horror.

**OSI** from **page 21**
gram said he does not foresee a time when the agency's OSI work will be completed.

Once the choices for various levels of the OSI model have been established, testing methods must be developed, said Bob Blanc, director of the Center for Computer Systems Engineering at NBS. In addition, the workshop group will have to turn its attention to the development of standards and implementation tests for network management, distributed processing and data security, Blanc said.

Recently, NBS officials proposed the formation of a global network, Osinet, that could be used to test OSI and CCITT concepts for network systems management. To date, 20 corporations have said they will participate in the implementation of this network, which will use AT&T's Accunet and Wang Laboratories' Wangpac for transmission media.

**Two smaller projects**

The Osinet project is actually two smaller projects. One involves conversion of the Department of Defense's data network to OSI and the second is development of a joint Manufacturing Automation Protocol/Technical and Office Protocol (MAP/TOP) implementation of the network model.

As a symbol of OSI's growing rather than declining role in the international standards arena, a group of Japanese companies were represented at the most recent OSI workshop and representatives from Nippon Telegraph and Telephone expressed interest in working with U.S. and European vendors on the X.400 electronic messaging standard.

According to the X.400 Committee Chairman Joseph St. Amand, "The Japanese are working with a version of X.400 which is significantly different from ours." He added, "The Japanese realize the need to reach a consensus with the U.S. and Europeans in order to allow global networking."

When asked what the proper roles will be for NBS and COS, Blanc noted that NBS plans to share its test methods with COS. COS's primary mission is to develop standards compatibility tests for products about to be brought to the market.

This new organization will also play a role in working with NBS to develop new protocols and standards.




Today, the telecommunications industry is making advances by leaps and bounds. To help you keep up with it, there's ICA. The International Communications Association—the association of large professional telecommunications users providing comprehensive, up-to-the-minute information and education in the fields of voice, data and image communication. ICA also sponsors one of the largest telecommunications exposition in the world. It's called "Telecom." And this year it's being held in Atlanta, June 2nd thru the 5th, at the Georgia World Congress Center.

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INTERNATIONAL COMMUNICATIONS ASSOCIATION

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## IBM INSIGHTS

**IBM** from **page 21**
something to offer customers installing private voice and data networks. The salesmen cringe as customers purchase AT&T 5ESS and the Northern Telecom, Inc. SL-100 switches. IBM is also said to be looking for a T-1 multiplexer, although it is not clear if the company wants to enter into an original equipment manufacturer's agreement or purchase a T-1 multiplexer manufacturer. Analysts also speculated that Big Blue is planning to offer some high-speed digital service units in the near future.

**Not ready to go head-to-head.** NCR Comten, Inc. is expected to announce its new front-end processor this morning. The company had originally scheduled the announcement for tomorrow. Someone at NCR took a close look at the calendar and discovered that IBM typically reserves the first and third Tuesday of each month for its announcements.

IBM announcements are also expected tomorrow. Rather than go head-to-head with IBM, NCR decided to step into the limelight one day early and put IBM on the defensive tomorrow.

# FACTORY COMMUNICATIONS

> A user might be planning to expand or relocate his factory in the next four or five years. If the user moves, he's going to have to wire from scratch. It's at this point that users will consider installing a MAP network.
>
> **Raj Melville**
> **associate**
> **Booz, Allen & Hamilton, Inc.**
> Lexington, Mass.

▶ SYSTEMS INTEGRATION

# Piecing together the networking puzzle

*Middlemen help plan network design.*

**BY BOB WALLACE**
Senior Writer

Without systems integrators, planning and implementing factory networks would be as simple as solving a Rubik's Cube while blindfolded.

Systems integrators run interference for factory managers who have difficulty piecing together today's factory networking puzzle. Such manufacturing giants as General Motors Corp., Ford Motor Co., Martin Marietta Data Systems, Inc., Whirlpool Corp. and IBM have turned to systems integrators for assistance in researching, designing and choosing products for factory floor networks.

These factory networking middlemen provide users with far more than just hardware. Systems integrators offer skills even the largest of companies do not have in-house. They sell project management, network design, network installation and network maintenance services. In addition, if a factory network planner has a product in mind for use on the factory floor, the systems integrator will research the product's capabilities, compare it to competing products and report the findings to the network planner.

Systems integrators maintain that the factory networker's worst nightmare involves selecting a system that does not allow for migration to emerging networking technologies and is soon obsoleted. Factory managers instruct systems integrators to review existing network equipment and equipment that will soon be available.

After such an analysis, the factory networker will often ask the systems integrator to represent the end-user company in purchasing factory floor gear from the myriad of equipment vendors.

Raj Melville, an associate with Booz, Allen & Hamilton, Inc. in Lexington, Mass., said systems integrators are most valuable in situations where a company's manufacturing staff and its industrial engineers are saddled with the responsibility of assembling a factorywide communications network.

"Often, these individuals cannot handle technical aspects of such issues as communications and information flow across a network," he asserted.

"The basic responsibility of a systems integrator is to quantify the user's needs and, based on those requirements, suggest a set of technologies that meet the user's requirements," Melville said. The systems integrator will then assist the end user with the implementation of the new network, he added. "The systems integrator should help the user design a factory system that can be brought on-line in a series of phases."

Clover Electronics, Inc. of Novi, Mich., joined forces with the technical staff of Ford Motor Co.'s Livonia, Mich., transmission plant to implement an eight-mile-long factory net that was brought on-line in a phased implementation ["Net by Ford," *Network World*, April 21].

Dan Riley, vice-president of Clover Electronics, said his staffers try to suggest tactfully to factory networkers which products they should use to create their plant floor system. "As a contractor, we are not locked into a certain product line," he claimed. "We believe we have an unbiased view of a wide range of commercially available products."

Clover Electronics packages software, hardware and design ser-

See **Integrators** page 24

FACTORY FACTS

**JAMES MOLLENAUER**

## Moving to the intelligent factory

Thanks to new networking technology, factory production workers will soon become classified as knowledge workers. This term has often been used as a synonym for white-collar workers. The term knowledge worker represents those who originate, process or consume information. This knowledge includes parts data — what part to make — as well as production scheduling and inventory — who should make the part and when. Until recently, the distribution of knowledge has been performed manually, or has involved stand-alone numerical control machine tools. Now, advances in networking are beginning to connect the production floor to the data environment.

The concept of connecting design and manufacturing equipment is not new. In fact, the idea of production equipment being directly wired to a design computer appeared in *Fortune* in the early 1950s. It has taken several recent advances to bring the knowledge-based factory from concept to reality. Advances in local-area network technology include:

- *Speed.* Local nets are far faster than previous data communications methods. Nets operating at 9.6K bit/sec are quickly being replaced by 10M bit/sec nets.
- *Reliability.* Integrated circuit technology is highly reliable and is provided with mechanisms that prevent a faulty unit from affecting the rest of the network.
- *Standardization.* The use of communications standards and the insistence of the General Motors Corp. Manufacturing Automation Protocol (MAP) program that all vendors use the same standard means that networks can be set up using equipment from many sources.
- *Cost.* The purchase cost of communications equipment has not been a major issue, although the use of common networks greatly reduces reconfiguration and setup expenses.

The merging of these factors is making the creation of integrated factory information systems practical. Although no single factor would support such an effort, standardization may prove to be the most important. Equipment vendors have historically attempted to lock end users into their product lines by employing proprietary communications schemes.

The view that open, standardized systems will produce large benefits for manufacturers is a relatively new one. GM, with its enormous purchasing power, has been able to catalyze a user revolt against proprietary networks under the banner of MAP. If MAP succeeds, users will enjoy substantial financial savings, but, more importantly, equipment from different vendors will be able to communicate over a single network. The result should be a productivity improvement in the overall manufacturing process, rather than an improvement in an individual step of the process.

*Mollenauer is network and communications technology manager for Computervision Corp., in Bedford, Mass.*

▶ PRODUCT NEWS

# Vuepoint enhanced

**BY BOB WALLACE**
Senior Writer

General Digital Corp. introduced a second microprocessor board that reportedly adds intelligence and a Basic-like language to its standard Vuepoint terminal.

The Smart Vuepoint is a complete operator workstation that off-loads all man/machine interfacing from a programmable controller. The vendor says the unit increases available programmable logic controller memory as much as 75% and reduces programming time.

The workstation is used to create and store displays, prioritize alarms, handle touch logic and guide operators through start-up procedures. All Vuepoint terminals are made of rugged, nonexplosive gas plasma displays and use touch-sensitive screens that give operators a list of appropriate responses.

A fully configured Smart Vuepoint will be available in late June for $4,500.

*General Digital Corp., 700 Burnside Ave., E. Hartford, Conn. 06108 (203) 528-9041.*

**Integrators** from **page 23**
vices for the user. The company also has network implementation crews that will pull cable and attach hardware in the end user's factory.

"We have data people who know protocols and interfaces, radio frequency engineers, network maintenance staffers and network designers," Riley said. When equipment problems arise, the systems integrators' staff will help locate and correct the dilemma — though that responsibility generally rests with the equipment vendors.

Riley argued that systems integrators are playing an increasingly important role in helping users construct complete networks that solve their manufacturing problems. He emphasized the widely held view that factory users buy applications, not hardware. "Vendors typically can only provide end users with equipment," Riley asserted. "Vendors don't support broadband [networking technology] beyond their own boxes," he added.

Riley claimed coaxial cable is the transmission medium of choice for backbone factory nets. Broadband network technology allows multiple networks to operate over a single coaxial cable. Each network uses a separate radio frequency channel on the broadband system. This multiple network capability cannot currently be supported on fiber-optic cable, although Riley said his company has used the cable for specialized factory applications. He predicted fiber-optic cable will not be widely used as a distributed information medium in factory applications for at least five years.

Riley said twisted-pair wiring is a one-project solution. Since twisted-pair wire cannot support multiple networks, adding a second application to the factory floor would require an end user to install a second wiring system.

D.A. Kelly, executive vice-president of Kel-Mat/DAK Co. in Pittsburgh, said the reliability of broadband technology is already well-established. He cited the use of coaxial cable in cable television systems for more than 35 years as proof of the medium's capabilities.

Kelly's company helped design and install IBM's manufacturing automation protocol (MAP) pilot test application at the computer giant's Endicott, N.Y., manufacturing facility ["IBM manages MAP Project," *Network World*, March 24].

Users can send their technical staff to Kel-Mat/DAK's courses on various aspects of factory networking.

The company will also conduct a site survey of a user's facility. The results of the study include suggestions as to which medium should be used for the backbone network, which equipment should be used with the network and how the system might be designed.

Kelly said users are concerned about a number of equipment-related issues. "Users are worried that the equipment they are considering might not be upgraded over time by the vendor," Kelly explained. That would leave the user in the unenviable position of having invested a large amount of money in equipment that is quickly obsoleted. "There are many companies that come and go rather quickly," Kelly warned. "And there are some vendors who haven't developed new products for a few years."

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## INCIDENTALS

A three-day workshop entitled "Fundamentals of Industrial & Manufacturing Engineering" will be held from June 25 through 27 at the Hyatt Regency Woodfield in Schaumberg, Ill. If your company has 10 or more employees who could benefit from this program, representatives of the Society of Manufacturing Engineers (SME) will come to your facility at a time convenient to you.

For details about in-plant programs, contact Lisa Sellars at (313) 271-1500, ext. 393. The seminar is sponsored by the SME's Special Project Division. For additional information on attending the event, contact Maria Kisell of SME at (313) 271-0039.

A free, six-page brochure on a soon-to-be-available Manufacturing Automation Protocol (MAP) study entitled "The Answer for Industrial Automation Networks" is available from CIMData, Inc. of Wellesley Hills, Mass. The brochure highlights the different features of a multiclient study of various aspects of MAP performed by CIMData. To obtain a copy of the brochure, contact CIMData at (617) 235-4124.

SME has announced that technical papers from the 1986 Flexible Manufacturing Systems (FMS) Conference and from the CIMTech Conference are available for purchase. FMS '86 is a collection of 21 technical papers that provide an orientation for both FMS newcomers and seasoned professionals. FMS '86 costs $64. The collection of 22 papers from CIMTech is also available for purchase. To order either collection of technical papers, contact SME at (313) 271-1500, ext. 418 or 419.

# COMMUNICATIONS MANAGER

"There will always be some local services that are deregulated. The local operating companies are still regulated to some degree. We determine where they serve and what happens if they abandon service. When push comes to shove, we will regulate local rates. However, for the most part, we are letting the market forces carry the game.

**Kale Case**
director, telecommunications division
Illinois Commerce Commission

▶ MANAGEMENT PROFILE

## Forging a fine-tuned financial network

*Prudential-Bache VP Rush talks about management, training and strategy.*


William Rush

*As senior vice-president of communications with New York-based Prudential-Bache Securities, Inc., William Rush manages a network that carries critical financial information to traders of Bache securities in more than 360 branch offices around the world.*

*The company transmits voice and data traffic over separate networks that are currently in a state of transition. Most of the data traffic is being transferred from a multipoint, 48M bit/sec terrestrial private-line network to a two-way transmission, Ku-band satellite network. Part of Bache's voice traffic that is currently handled through Centrex will be shifted to a private branch exchange. Rush is also considering using an AT&T Software-Defined Network for future voice needs.*

*Although Rush is directly responsible for coordinating the communications technologies employed in the multinational network, the majority of his time is spent managing the staff of network employees who keep the traders online. Rush recently spoke with* Network World *Senior Writer Margie Semilof on Bache's networking strategy and the changing role of the communications manager.*

**Is it tougher to manage communications in a small company or in a larger one?**
Regardless of company size, managing communications is vastly more difficult than in the past, but the financial and professional rewards are better than ever.

The communications manager with a small firm may not receive the individual recognition that a communications manager receives in a larger company. They have smaller budgets and their job is sometimes viewed by upper management as unimportant. This makes it more difficult to get senior management's attention and harder to get a job done. Also, a small company manager usually has a small staff. Some of the staff may even be part-time employees.

Large company communications managers get more recognition from senior management. This makes it easier to sell ideas and move ahead with projects. But the problems of large firms' networks are often more complex than those of small firms' networks.

**How much time do you spend delving into regulatory issues?**
I have staffers who monitor regulatory activities. I don't have the time to help shape the regulatory environment. It is a lot tougher these days to have any influence at the FCC.

**How do you divide your time between management concerns and technology issues?**
My job is probably about 80% management and 20% technology. One of my toughest jobs is planning a cogent communications strategy that

See **Rush** page 26

▶ MANAGERS' TOOLS

## IBM founds book unit

*New department to publish aids for users.*

**BY MARGIE SEMILOF**
Senior Writer

IBM announced the formation of IBM Books, a new department that will publish books designed to help business professionals use computers more effectively and productively.

The books are written by IBM employees and other information processing experts. The six titles slated for release this fall cover topics such as portable computing, networking, business graphics, word processing and maintenance and include a dictionary of computer terms.

The books will be sold in book stores and other retail outlets. IBM plans to publish up to 20 different titles a year.

GUIDELINES
**MARGIE SEMILOF**

## Worthless certificates?

We appear to be in the midst of a minicraze. Every professional industry group wants to legitimatize communications professionals by offering them certificates.

Unfortunately, these certificates are pretty worthless to anyone hiring communications professionals. No wonder. Most of them don't require any proof of expertise. Consider the following example.

The latest laureate is brought to us by the Office Automation Society International (Oasi). What makes their deal different is that they allow professionals participating in the certification program before Sept. 30, 1986, to skip a qualifying test. Candidates' evaluations are based on written information they provide.

When approved, they receive a "handsome plaque and the official designation of Coap," or certified office automation professional.

The qualification proposal says that applicants "need not be computer experts," even though they should have experience in computer use, office automation equipment or software. Applicants should provide evidence that they "keep up to date." Oasi is not exactly bucking for exclusivity.

Do hiring managers really care if prospective job applicants are certified by a professional society or own a wall plaque? It's doubtful. Most managers don't take stock in anything but a college degree or a resume full of proven experience.

These accolades are, at best, silly. Their existence only serves to water down the impact of a certificate earned by a professional from an accredited institution.

## PEOPLE

**Anthony J. Iorillo** was elected vice-president of Hughes Aircraft Co. and president of the company's Space and Communications group. Iorillo replaces **Albert D. Wheelon,** who was appointed Hughes executive vice-president of operations.

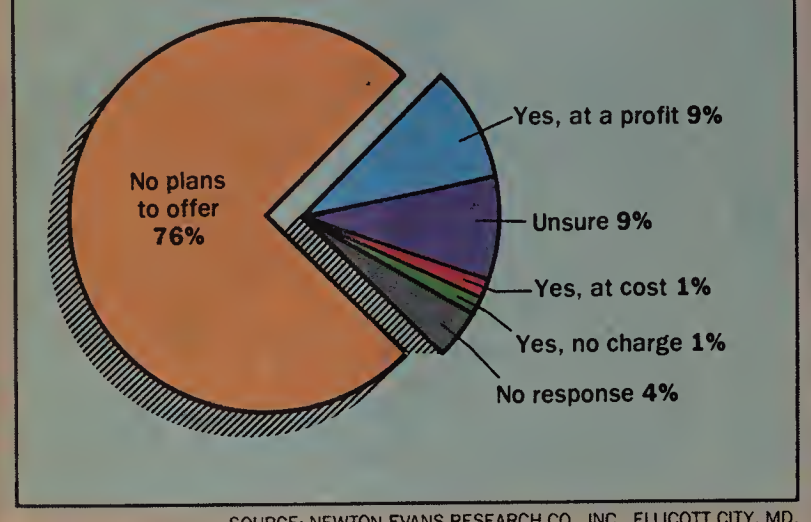
**David Macklin, Ronald Row, John Harrahy, Robert Ullenbruch and Daniel O'Leary** were presented with the U.S. Navy's highest award for industry quality for their performance working on naval communications systems. The five are employees of the GTE Communications Systems Division.

Northern Telecom, Inc. announced three executive appointments in its integrated office systems group, which is responsible for integrated office systems.

**David Lambert** was appointed vice-president of Northern Telecom's Midwest region; **Harold Billings** was appointed vice-president of the Southern region; and **Roger Moore** was appointed vice-president of the Eastern region.

See **People** page 26

## Are users selling excess network capacity?




SOURCE: NEWTON-EVANS RESEARCH CO., INC., ELLICOTT CITY, MD.

**People** from **page 25**

**Dalton W. Martin** was appointed vice-president of operations at Telenova, Inc.

**Joseph C. Consoli** was named vice-president and chief financial officer of Equatorial Communications Co. Consoli replaces **George Lao,** who recently retired.

**John A. Lockitt** has been named president and chief executive officer of Codex Corp. Lockitt most recently served as Codex's senior vice-president for wide-area network operations. He succeeds **James W. Storey,** who has accepted another position for Motorola, Inc., the Codex parent corporation.

**Archie J. McGill** was elected to the board of directors of Intelligent Communications Networks, Inc.

**James D. Norrod** was appointed president and chief executive officer of CGX Corp.

Most recently, he served as vice-president of sales for Auto-trol Technology Corp.

**Gregory R. Weber** was appointed vice-president of finance of Lightnet, Inc.

Digital Equipment Corp. has announced the promotion of three senior managers to vice-presidential positions.

**Ilene B. Jacobs** was appointed vice-president and corporate treasurer. **Bruce J. Ryan** was promoted to vice-president and corporate controller. And **David L. Stone** was appointed vice-president of international engineering and strategic resources.

MANAGEMENT RESOURCES

# Publications offer a wealth of data

*Firms market reviews, surveys, training tools aimed at users.*

Applied Computer Research, Inc. released several periodicals and research materials designed for communications managers.

The EDP Performance Review features a survey of 504 performance-related software packages and a bibliography of 1985 performance-related literature.

The software survey describes commercial products designed to measure and improve system performance.

The EDP Performance Review is priced at $40 for nonsubscribers and $30 for subscribers.

The 1985 Cumulation of the Computer Literature Index includes information on more than 7,600 articles published in nearly 300 periodicals and more than 1,100 books, conference reports and special reports.

The index has been published since 1968 and cumulative issues are available. ACR has established a discount price schedule for users interested in purchasing an entire set.

In quantities of four or less, issues cost $35. By purchasing all issues from the past five years, the price is reduced to $30 per issue.

A set of Computer Literature Index Cumulations from 1975 to 1985 can be purchased for $200.

The Directory of Top Computer Executives lists managers who oversee communications, MIS and other related functions in corporations with an annual EDP budget of $250,000 or gross annual sales of more than $50 million.

The directory is organized geographically and cross-referenced by company names.

Separate editions are published for the Eastern and Western U.S. each year. The Directory of Top Computer Executives is priced at $95. The cost of the pair is $175.

*ACR, Inc., P.O. Box 9280, Phoenix, Ariz. 85068.*

Illinois Bell will offer training sessions for managers responsible for the planning, installation and maintenance of fiber-optic systems.

Sessions cover the components of a light guide system, the manufacturing of fiber, fiber applications, economic comparisons of fiber vs. alternate technologies and comparing and analyzing vendor responses to requests for quotations.

The sessions also give participants hands-on demonstrations with various types of fiber-optic equipment.

Classes are scheduled for May 20-22 and June 3-5 at Illinois Bell's Westmont Training Center, Westmont, Ill., and June 17-19 in Shaumburg, Ill. The course costs $675.

For more information, call (312) 963-8156.

**Rush** from **page 25**

will address various business functions. Once you develop a tactical answer in the communications realm, you have to relate that back to the businessman.

The job of data processing manager may be easier than that of the communications manager, because DP managers only get involved in detail when there is a new application coming onto the network.

For example, the only way for the data people to develop an on-line [securities] trading system is to live with the traders and see how they work.

Communications tasks are not as consistently application-oriented as are DP tasks.

Communications managers must begin to spend more time with their users to understand what those users do and how we can improve support.

**How much time do you spend educating your staff?**

No time in the technical area. I expect them to come in with technical expertise. When there are gaps in their education, we send them to seminars.

**Is on-the-job technical training a thing of the past?**

Some of it is worthwhile. But on-the-job training alone leaves educational gaps. It is very difficult to formulate a formal approach to a person's training.

**Why are you switching to a Ku-band satellite network?**

The private lines provide brokers a five-second data response time. But at least 2% of the network is usually down because of a high terminal user-to-computer ratio.

These crashes shut off access to on-line stock market quotes through news providers like Dow Jones & Co., [Inc.]

That percentage is unacceptable in our business, because you rip the tools out of the account executives' hands.

Our existing network is not satisfactory, because terrestrial lines do not have enough bandwidth and their deployment is too slow.

**Have the long private-line installation lead times of last year diminished?**

There has been a big improvement from the private-line backlog of two years ago. But it still takes almost two to three months to add another branch or line.

ASSOCIATION WATCH

# ICA vies for worldwide role

International Communications Association (ICA) President Duane Heidel said the ICA is vying for a more visible role in the international communications arena through its relationship with the London-based International Telecommunications Users Group. The two associations, along with a third group, the Telecom Managers of London, are planning a worldwide user conference this October.

The ICA will hold its next meeting June 2-5 in Atlanta and will focus on using telecommunications as a strategic corporate asset.

The National Rolm Users Group will meet June 2 through 5 at the ICA conference in Atlanta. The group will be discussing Rolm Corp.'s possible changes in or elimination of CBX private branch exchange support.

It will also be planning a future meeting with Guide, the IBM computer users group.

For more information, contact the National Rolm Users Group, P.O. Box 691, Memphis, Tenn. 38101. Rolm users can also contact Charles Garrison, vice-president and nominating committee chairman, at (312) 786-7201.

The New York-based Communications Managers Association (CMA) will hold its annual meeting on May 21. Lee Selwyn will speak on tariff changes.

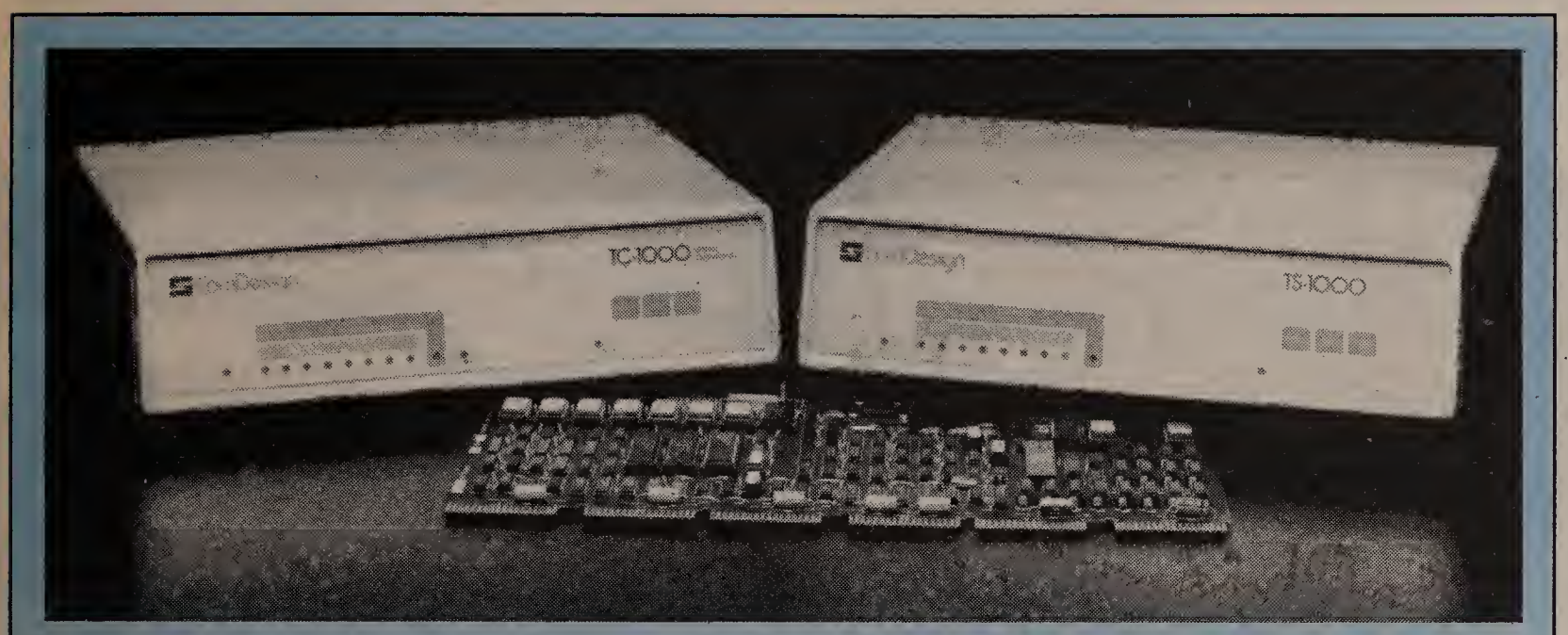
At the recent Network Users Association (NUA) meeting, the NUA voted to change the focus of its Open Systems Interconnect (OSI) technical committee.

NUA President Michael Harrop said the OSI group will evolve into an OSI users group, which will provide a forum for sharing information and experiences on OSI implementation strategy and network migration. NUA's OSI group currently limits its efforts to reporting on OSI committee activities.

Harrop said NUA plans to link its members via electronic mail and conferencing bulletin board systems.

# NEW PRODUCTS AND SERVICES

See inside for:
- New network node
- Time management tool
- IBM channel interface




▶ COMDESIGN

## Quad link muxes debut

*TC-1000 and TS-1000 pair up.*

**BY JIM BROWN**
New Products Editor

GOLETA, Calif. — A pair of asynchronous, multipoint, quad link statistical multiplexers were introduced by ComDesign, Inc.

Together, the TC-1000 Unibus Concentrator and TS-1000 statistical multiplexer support up to 64 concurrent terminal sessions with a host Digital Equipment Corp. VAX superminicomputer. The TC-1000 consists of an expansion board connected to the DEC Unibus backplane and a statistical multiplexer.

The board gains direct memory access on the VAX superminicomputer by emulating the asynchronous portion of eight DEC DMF-32 Communications Controllers running under the VMS operating system.

It supports up to 64 lines on a single cable and can be connected to a TC-1000 statistical multiplexer located at least 25 feet from the host.

The unit connects to a TS-1000 statistical multiplexer at the remote site with RS-232 ports.

Because of quad link capabilities, the TC-1000 user can establish communications links with up to four remotely located TS-1000 units. The user can program the number of lines each link will support.

Used as a stand-alone unit, the TS-1000 switching multiplexer supports up to 32 channels distributed over up to four remote links.

The TS-1000 provides switching and port contention capabilities and also allows users to program the number of channels supported by each TS-1000 generated link.

The products operate at local speeds of up to 9.6K bit/sec with link speeds of up to 64K bit/sec. Both units have built-in diagnostics as well as supervisory functions.

The TC-1000, which replaces ComDesign's TC-3 Terminal Concentrator, lists for $7,500. Prices for a TS-1000 unit start at $2,100 for a four-channel version.

▶ CODEX CORP.

## Test software unveiled

*Software analyzes conditioned phone lines for Series 2600.*

MANSFIELD, Mass. — Codex Corp. released software for testing conditioned telephone lines used with its recently announced Series 2600 coded modulation modems.

The Codex Communications Test Equipment (CTE) software runs on Codex network management systems including the DNCS 200, DNCS 300 or Codex 4800 Series. It tests the condition of Class C and Class D tariffed analog lines and analyzes the data streams from its Series 2600 modems. The package allows in-house network managers to conduct tests that are similar to circuit quality tests Bell technicians use on leased lines.

The CTE software performs preprogrammed and automated Transmission Impairment Measurement Set (Tims) tests and Remote Data Scope (RDS) tests. Operators can configure the package to conduct, control and execute the tests from a central site and then display the results on network management system terminals.

The Tims tests were designed to meet Bell System Technical Reference 41009 and IEEE specification 743-1984. In a 10-minute test cycle, the CTE's Tims tests will measure the receive level, signal-to-noise ratio, phase jitter, and harmonic, amplitude and envelope delay distortions of any point-to-point or any segment of a multipoint or multitier network using conditioned telephone lines. During the Tims tests, acceptable Bell parameters are displayed on screen and any condition found to be out of specification is highlighted.

The package's RDS component can monitor data being transmitted or capture up to 1,024 bytes of data from the line and relay it back to the central test site for display and analysis. With the RDS tests, network managers can evaluate protocols to identify possible errors and mismatches.

The CTE package costs $1,500.

▶ DATAPOINT CORP.

## Arcnet link to IBM out

*Stargate server first stand-alone gateway to SNA.*

SAN ANTONIO, Texas — Datapoint Corp. introduced several new products, including a communications controller connecting devices on its Attached Resource Computer local-area network (Arcnet) to IBM networks. Also announced were an IBM Personal Computer AT-compatible file server, a pair of modems and an Arcnet supported workstation.

The firm's IBM Systems Network Architecture/Synchronous Data Link Control gateway, called the Stargate Communications Server, makes IBM hosts believe Arcnet attached devices are IBM 3278 and 3777 terminals. The Stargate is Datapoint's first stand-alone gateway replacing Arcnet-connected processor interconnection with other manufacturers' equipment.

Driven by a Motorola, Inc. 68000 microprocessor, the Stargate Server supports between 20 and 100 Arcnet connected devices with synchronous data transmission rates of up to 19.2K bit/sec. The Stargate Server costs $6,250.

The Starserver 10 file server, based on an Intel Corp. 80286 microprocessor, supports four to 10 Arcnet connected processors with 60M bytes of hard disk storage, expandable to 120M bytes. It holds 512K bytes in its main memory and 4M bytes in its cache memory. It supports up to 16 on-line disk operating system volumes, holding a maximum of 12.5M bytes each. The IBM Personal Computer AT-compatible Starserver comes with MS-DOS and file server software for $11,495.

Also announced were the single-port Race I and dual-port Race II modems operating in full-duplex with autodial and adaptive line equalization features. Both models have an alternative Bell 103J mode of operation and send asynchronous binary serial data at speeds up to 19.2K bit/sec over public or private telephone lines. The Race II can support concurrent printer and terminal access. The Race I lists for $1,495. The Race II is $1,695.

Also using Intel's 80286 is the Arcnet proprietary Deskstar single-user processor running on either resource management system or datapoint disk operating system software. The unit costs $3,995.

## PRODUCTS & SERVICES

**Network node**

Develcon Electronics, Inc. introduced a second node for its Develnet distributed network, the Series 6000 node.

The asynchronous **Series 6000** node supports 31 physical or multiple virtual circuit interfaces and up to 1,024 addresses. It transmits at speeds up to 24M bit/sec. As many as 16 Series 6000 nodes can be clustered, giving the Develnet network the ability to support more than 16,000 addresses with an aggregate data rate of 384M bit/sec.

The Series 6000 node supports RS-232-C and limited distance data set interfaces, as well as statistical multiplexers and X.25 networks.

A Develnet network with Series 6000 nodes costs roughly $250 per connection. Cabling and installation charges are extra.

*Develcon Electronics, Inc., 856 51st St. E., Saskatoon, Saskatchewan, Canada S7K 5C7 (306) 933-3300.*

**Time management tool**

**Conetic Systems, Inc.** introduced a software package that will let personal computers share appointment calendars, electronic mail and telephone message boards on a local-area network.

The **Higgins** package runs on a file server in IBM's Personal Computer Network and IBM-compatible networks, including 3Com Corp.'s 3+Plus, Novell, Inc.'s Netware and AT&T Information Systems' Starlan. A single server configuration supports five personal computers. An upgrade kit allows five additional users on the server.

The multimodule package gives users access to a relational data base to perform such functions as individual and group appointment scheduling, interactive electronic mail, expense reporting, document filing and telephone message forwarding.

The package also delivers calendar, calculator, note pad, telephone dialer, timer clock and reminder desk accessory functions to each user. Security functions include text file encryption and the ability to lock private data bases, messages and appointments.

The single server costs $995. The upgrade is priced at $695.

*Conetic Systems, Inc., 1470 Doolittle St., San Leandro, Calif. 94577 (415) 430-8875.*

**List 5 T-Serve**

**Kentrox Industries, Inc.**, a subsidiary of Plantronics, added new features to its T-Serv channel service unit (CSU) for T-1 line transmissions.

The **List 5** configuration features include front panel jacks to monitor and test T-1 lines, a front panel LED indicating reception of bipolar violations from the T-1 network and coding techniques for the elimination of double-ended loopback.

The basic T-Serv unit has switch-selectable local or line powering and a built-in loopback generator. It also is B8ZS-compatible at 64K bit/sec and has optional fault-locate filtering. The T-Serv List 5 interfaces with T-1 communications equipment, meets Federal Communications Commission Part 68 and Part 15 requirements and is compatible with all T-1 transmission equipment.

The List 5 T-Serv CSU costs $1,820. Current T-Serv units can not be upgraded with List 5 features.

*Kentrox Industries, Inc., a subsidiary of Plantronics, Inc., 14375 N.W. Science Park Drive, P.O. Box*



## PRODUCTS & SERVICES

*10704, Portland, Ore. 97210 (503) 643-1681.*

**IBM channel interface**

**Mitek Systems Corp.** introduced a pair of IBM channel interfaces that increase the speed at which data moves between IBM mainframes and other computer systems.

The **M1010** IBM channel-to-multibus adapter supports the use of any multibus-compatible interface and moves data between an IBM channel and multibus memory.

The **M4011** IBM channel to DR11-W adapter supports data movement between IBM mainframes and systems with Digital Equipment Corp. DR11-W interfaces. The M4011 provides both the hardware and software needed to support data transfer between the mainframe memory and the DR11-W system memory at speeds of more than one million byte/sec. Both products incorporate Mitek's proprietary channel technology based on bit slice architecture that supports data transfer off the IBM channel at burst rates of 1.8M byte/sec.

The M1010 is priced at $20,000. Cost for the M4011 ranges from $24,000 to $32,000, depending on the number of DR11-W interfaces supported.

*Mitek Systems Corp., 1303-B Marsh Lane, Carrollton, Texas 75006 (214) 242-8277.*

**Meridian SL-1 address**

**Northern Telecom, Inc.** added one product to its Meridian SL-1 integrated services network family of products and enhanced two others.

The Asynchronous Interface Line Unit (Ailu) connects asynchronous Ascii-compatible terminals to the Meridian SL-1 over standard telephone wiring. It consists of a cable with a RS-232-C terminal connector and a RJ-11 telephone jack connector allowing terminals up to 4,000 feet from the Meridian SL-1 to communicate at speeds up to 19.2K bit/sec.

Associated Ailu line cards make speed calling, automatic dialing and queuing on busy computer ports or modem pools accessible from the terminal keyboard.

The Ailu costs $90.

The Lanstar Coax Elimination and Switching System was enhanced to allow IBM 3270 series terminals on the Meridian SL-1 integrated services network to address local or remote Ascii hosts. The IBM terminals can emulate Digital Equipment Corp. VT100 terminals and transmit data at speeds up to 19.2K bit/sec.

Lanstar allows IBM 3270 series terminals 4,000 feet or more away from IBM 3274 or IBM 3276 cluster controllers to communicate over twisted-pair wire rather than coaxial cable at speeds up to 64K bit/sec. Screen menus allow a choice between IBM 3270 series and DEC VT100 terminal modes.

Also added was a digital trunk compatibility linking twisted-pair telephone wired IBM 3270 terminals on Lanstar to Northern Telecom's Digital Trunk Interface (DTI) in order to access T-1 line service. The feature allows IBM 3270 series terminal access to remote IBM 3270 series host computers at speeds up to 56K bit/sec and Ascii hosts at speeds up to 19.2K bit/sec. Lanstar Coax Elimination and Switching System prices start at $825 per connection. The enhancements will be available in the third quarter.

*Northern Telecom, Inc., 200 Athens Way, Nashville, Tenn. 37228 (615)734-4576.*




# Souped-up Centrex.

## Hot new performance from AT&T.

Spread the word: the 1986 model Centrex from AT&T Network Systems is loaded. Now your telephone company can offer you advanced equipment options. New data communications and office automation capabilities. More customer control of features and station numbers than ever.

In all, 15 major improvements! Plus AT&T can help your telephone company customize a Centrex system to meet your special needs.

The 1986 model Centrex. Another product on the road to Universal Information Services: helping your telephone company give you any kind of voice, data or image service, conveniently and economically, over the public telephone network.

That's what makes AT&T "The right choice."

### Featured Options

- **Customer Station Rearrangements.** Lets you change features and numbers for each telephone, saving time and money.
- **Customer Message Center.** Centralizes call answering within a business location.
- **Integrated Voice/Data Transmission.** Simultaneous voice/data transmission at up to 19.2 Kb/s, eliminating modems and separate data lines.
- **Advanced Station Message Detail Recording.** Instant access to reports on dates, times and lengths of calls made within your business location.
- **City-Wide Centrex.** Gives multi-location customers the benefits of being on a single Centrex system.
- **Facilities Management.** Allows automatic changes of Electronic Tandem Switching features from one terminal.
- **General Processing.** Office automation using the AT&T 3B computer and user-friendly management software packages.
- **Network Terminals.** New station sets with one-button access to Centrex features and programmable memories.

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AT&T
The right choice.

# Do minis beat local nets

## PRO:

**BY JOSEPH FORGIONE**
Special to Network World

The trend toward networking has accelerated with the penetration of personal computers in the workplace. With millions of instructions per second at users' fingertips increasing all the time, users tend to do more computing locally. They can now maintain their own data bases and do word processing and spreadsheets locally. However, there are drawbacks to this increase in personal computing, including a tendency to share less information, a loss of control by the management information systems manager and, often, a costly duplication of information resources.

While personal computing has resulted in incredible individual productivity gains, its cost has been a decrease in organizational productivity. To compound the issue, because overall productivity has increased, very few people realize the magnitude of the problem. As a result, the increase in productivity is probably less than it could have been.

Clever MIS managers are now beginning to see that the true potential of personal computing is in a combination of both local processing and organizational sharing. MIS managers are beginning to regain control of the information resources of their companies. In their attempt to regain control, MIS managers face many alternatives, including stand-alone personal computer local-area networks, micro-to-mainframe links and departmental computers. While each of these may be appropriate to a specialized niche in the organization, it is the traditional departmental computer — the minicomputer and the newer superminicomputer — that offers the most flexibility and the greatest potential to the organization as a whole. The machine that created distributed data processing is now emerging in a new role as the value-added link for personal computing.

*Forgione is manager of communications product marketing for Data General Corp. in Westboro, Mass.*

The departmental minicomputer is the most powerful choice because its structure is most like an organization's structure. The departmental computer is like a manager in an organization who acts as a central point of coordination and control for his employees. The minicomputer acts as a gateway to higher level managers, or mainframes, as well as to peer-level managers in the organization.

A more formal analysis of the alternatives shows the specific advantages of using minicomputers for departmental computing. There are many issues that can become the basis for selection of a particular networking alternative. Some of these issues are:

- Functionality;
- Spport and control;
- Response time;
- Cost;
- Compatibility with existing resources;
- Resource sharing.

In assessing the advantages of alternatives based upon these criteria, it is clear that the departmental minicomputer combines the advantages of both distributed processing and centralized control. It can offer very complex functionality, such as integrated office automation or distributed DP, cost-effectively. It provides a central repository of information, that is, files, documents and programs, as well as access to a wide variety of resources such as laser printers or wide-area networking communications facilities.

Finally, it establishes a clear point of coordination and control for the MIS manager with respect to end users. As a departmental processor, a minicomputer can be used in a variety of ways. As an applications processor, it can serve a community of users by providing specific, often highly computer-intensive applications. An example of this is an integrated office automation system. The office automation server can provide functions such as electronic mail, scheduling and voice messaging.

An applications processor can be networked on local-area nets such as an Ethernet, with other applications processors providing different functions. Through an attachment to a terminal services device, users can establish a session with any applications processor, the selection depending on the application needed.

As a resource manager, the departmental processor can become a file or disk server for a community of users. It can also provide the hub for the use of specialized devices such as laser printers and color plotters. It becomes a very

See **Pro** page 40

**TECHNOLOGY**
**IAN ANGUS**

# The perfect device that never was

The voice/data private branch exchange was very nearly a victim of its own advertising. Like local-area networks, fourth-generation languages and new Coke, voice/data private branch exchanges were claimed to be the greatest invention of all time.

This messiah theory of technology — the idea that there could be a perfect technology to solve all problems — was bound to create massive disillusionment. When someone announces he's going to deliver the moon and stars and then delivers a street lamp, people soon forget that a street lamp is a useful thing to have. They also forget that the possibility of delivering the moon and stars was slight to begin with.

If Thomas Edison had announced he was going to abolish darkness and then invented the light bulb, he might have been written off as a failure. The electric light bulb may not have abolished darkness, but it did solve a specific set of problems.

Similarly, the data capabilities of digital PBXs are now escaping the advertising hype and getting into the hands of managers who have real problems to solve.

*Angus is president of the Angus Telemanagement Group, Inc. in Toronto.*

Those managers are discovering that the voice and data PBX is not the ultimate solution to all communications problems. It isn't everything to everybody because, after all, nothing is. It's not a super controller; it's a set of tools, a set of solutions to a definable set of problems.

In some cases, it's the ideal solution. In others, it's a partial solution. And in still other cases, it doesn't fit at all. If the need is for basic micro-to-micro communications, a digital PBX works pretty well. But, if full-motion, full-color video is needed, the PBX is not a contender.

In between those extremes are hundreds of intermediate problems, for which PBX data switching may or may not be an appropriate solution.

Managers who got past the hype are realizing that integration is a feature — not a benefit. Putting the word "integrated" in front of anything doesn't make it better. Putting two functions into the same device doesn't automatically make the device more valuable.

Instead of asking, "Is it integrated?" managers need to ask, "What problems does it solve? What does it do for me in the real world? How does it help solve our problems of connectivity and communications?"

In the last two years, there has been a significant change in the ways people deal with telephony. Between 1975 and 1983, most managers viewed the digital PBX primarily in terms of its ability to deliver good telephone services and perhaps some advanced voice features. The voice and data features were purchased as a hedge against the future.

Large numbers of organizations installed digital PBXs because they might use the data features in the future, but very few actually implemented those features.

Today, more innovative users view the PBX as one of the tools they have available to solve a wide variety of voice and data communications problems. A major hospital is using a digital PBX to handle asynchronous data communications because terminals in the hospital are moved very frequently. Being able to move a terminal anywhere there is a phone gives this technology an edge.

An engineering firm has nearly a dozen different minicomputers that are optimized for special applications.

Using a voice and data PBX allows its staff to access any minicomputer from a single terminal. Neither of these applications is earth-shattering, but each one solves real problems. And that is more valuable than all of the messiah technologies in the world.

The managers responsible for these solutions do not generalize. They say things such as, "This works for us, but, of course, my application isn't typical."

They're judging themselves against the brochure promises of all-comprehensive, all-complete solutions. In reality, no one is typical.

There aren't any typical organizations.

Technical solutions make the best sense when they are designed to meet specific needs — not when they match somebody's idea of how the world ought to run.

# for departmental networking?

# CON:

**BY H. MAURICE FRANCE**
Special to Network World

Just as minis ushered in the era of distributed processing, personal computers have delivered computing to the desk top. Today, personal computer-based local-area networks accommodate departmental needs more effectively than minis and help organizations regain control over their scattered resources.

Networked personal computers have a number of advantages over mini-based systems, the first of which is performance. Processing power in a personal computer resides in the CPU on the user's desk. Adding users means acquiring more CPUs. In contrast, minis require the augmentation of memory and I/O ports to add users and may eventually become I/O-bound. Because networked personal computers handle real-time keyboard interaction by the user, the file server on a personal computer network is free to move files.

With this distributed architecture, personal computer networks allow resources such as printers or servers to be added incrementally. A mini, however, eventually saturates memory and I/O capability, and requires investments in new machines that may not be able to communicate with the first mini or to allow users access to both minis.

There are a number of cost savings associated with personal computer networks. Peripherals such as laser printers and modems can be shared more cost-effectively on a local-area network. Adding proprietary peripherals to a minicomputer can cost up to five times as much as adding less expensive generic peripherals.

Software's cost and availability are issues not to be ignored. Enormous volumes of software are already available on personal computers at rock-bottom prices. With applications ranging from spreadsheets and word processing to data bases and electronic mail, off-the-shelf packages turn virtually every knowledge worker into a programmer. For the first time, managers can directly translate ideas into useful software tools.

Personal computer networks also require less equipment and, in many cases, eliminate the need for a computer room with its special power and air conditioning requirements.

This saving becomes more pronounced when redundancy of critical parts, which allows work to continue during a system failure, can be avoided.

A personal computer local-area net has high resistance to single-point failures and even allows the user to operate in a stand-alone mode in the event of a total network failure.

A problem with a central mini, however, not only puts all users out of commission, but risks losing all the work that was in process at the time of the failure. Without a host, a dumb terminal is only a dumb terminal.

Personal computer networks also greatly reduce dependence on a single vendor. The availability of personal computer-compatible products and the many sources of application software have created a competitive environment for systems, software and maintenance services.

Another benefit is the user's ability to perform work on his networked personal computer and maintain the data on a floppy diskette that can be placed under lock and key in the user's desk. This physical file privacy is useful when working with sensitive personnel and cost data or special projects that users may be reluctant to share with others before completion.

Because many jobs can be carried home on diskette to be finished, personal computer-based local-area nets have resulted in greater productivity. This type of electronic briefcase is far more convenient than using a dumb terminal and a modem to call the office.

**The big picture**

Unless linked together, clusters of personal computer networks can create isolated islands of productivity. How can personal computer networks scattered throughout an organization continue to increase productivity and efficiency and also be brought into the complete information processing picture?

One way is to connect departmental networks to a broadband coaxial cable that runs throughout a facility. This broadband backbone reduces the expense associated with adding new users and resources. It also anticipates future commu-

See **Con** page 40

*France is deputy general manager of technology for TRW, Inc.'s Information Networks Division in Torrance, Calif.*

**STANDARDS**

**T. DOANE PERRY III**

# ISDN Observations: US vs. Europe

Although the topic of integrated services digital ntworks is timely, it's peculiar that it always seems to require a great deal of explanation. While ISDNs are intended to make things simple, they are paradoxically abstruse. Ironically, users are attracted to the complexities of ISDNs through the human desire to make things simpler.

ISDN can be defined with just four elements: end-to-end digital connectivity and full interworking between public and private networks; integrated access to carrier service options; a limited set of open, standard interfaces; and new levels of customer control and flexibility via end-to-end, out-of-band signaling.

In the U.S., even though ISDN is largely AT&T's grand plan for its national network, it's important to remember that the initial integration of ISDN will occur in the local exchange and subscriber network. Separate packet-switched, circuit-switched, dedicated and common channel signaling facilities will continue to serve as transport networks for the basic ISDN. Thus, the local exchange is the critical ISDN component.

To telephone companies, ISDN is the marketing label for making central office switches digital so that they can support more services. ISDN will help keep the Bell operating companies sailing by enhancing their central office Centrex services so that business won't slip away to the bypassers. If ISDN does resuscitate Centrex, much of the need for private branch exchanges will be eliminated. But with PBXs selling well in the low and high ends of the market, Centrex first will re-emerge in the middle of the market.

The BOCs hope that ISDN will help Centrex win some share of the lucrative high-end market. However, one prerequisite for success at the high end is marketing and joint development with users that don't generally perceive the power of Centrex. For ISDN to be successful, the BOCs must keep in mind that users in different industry segments want different ISDN features. For that reason, the BOCs' ISDN trials are designed to determine what services large customers want. The trials are not tests of the ISDN standard, which is still under development.

The ultimate objective is that all ISDNs — those of the regional BOCs, the local exchange carriers, other common carriers, private companies and eventually even those of other countries around the globe — will network with one another. Ideally, the user should be able to mix and match private and public network facilities in the most effective manner.

In Western Europe, users are excited about ISDN, because it promises to reduce the cost of transmission for carriers and their customers by integrating the small, but separate, facilities used to transmit data over the larger voice network. If ISDN-based data transmission partakes of the economies of scale currently enjoyed by the European voice network, data transmission will be cheaper for the national carriers. These carriers could pass on the cost savings to their customers. PBX-based private ISDNs are already important to large European corporations — where they are permitted to exist. Currently, private ISDNs are allowed in just two countries: the UK and Norway.

ISDN reinforces the control of the Postal Telephone and Telegraph administration over the European transmission network and terminal equipment market. The PTTs can use variations on the ISDN standard to exclude effectively nondomestic vendors from their national terminal equipment markets.

But while European users confidently expect consistent, government-mandated and controlled ISDN services, U.S. users are skeptical that their ISDN will be balkanized, as X.25 services have been, so that slightly different flavors of a supposedly universal standard make customers captives of particular vendors.

Their skepticism is well-founded. In the U.S., there are plenty of existing non-ISDN transmission approaches, systems and protocols. To the extent that they duplicate ISDN and vice versa, the cost of communications for users will increase. But bearing the cost of

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*Perry is senior research consultant of telecommunications for International Data Corp. in Framingham, Mass.*

NETWORK WORLD

# Features

May 19, 1986

**One-stop network shopping**
Value-added dealers and resellers, manufacturers, retailers and distributors — there are almost as many options in buying a local-area network as there are people who sell them. Users should compile a network shopping list before deciding which supplier is best.
**This page.**

**Paint by computers**
An 11-node network on two continents is making more efficient the manufacturing operations and inventory management at the Pittsburgh-based PPG Industries, Inc. The net is achieving coordination between plants that was previously unattainable, while adding color to PPG's earnings.
**Page 35.**

**The Packet Racket**
Careful buyers of packet assemblers and disassemblers should weigh the cost against the capabilities when hunting for a reliable specialized concentration device for their networks. New technologies are making PADs a more viable alternative, even for synchronous traffic.
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▶ VALUE-ADDED NETWORKS

# One-stop Network Shopping






# In today's market, sorting out the suppliers in search of a local-area net can be as strenuous as a trip to the used car lot.

**BY MARY PETROSKY**
West Coast Correspondent

Shopping for a local-area net can be as exhausting as shopping for a car. But in both cases, the dealer makes all the difference in terms of price, support and options.

One user described the search for a net as "an arduous, absolutely horrendous process." Yet it need not be if the buyer knows what he wants in a local-area network supplier.

The lack of networking experience in large and small organizations alike has spawned a variety of network resellers eager to trade on their often newly acquired expertise. These resellers range from consultants who only sell services, to retailers who have added networks to their stock of microcomputers and peripherals. An important type of supplier to emerge over the past few years is the value-added dealer who sells only networks.

Unlike the value-added reseller, who typically promotes networks as a way to sell vertical application software, the value-added dealer takes a horizontal approach. Many dealers consider themselves systems integrators and offer a wide range of network hardware. They generally combine consulting, sales, installation, training and maintenance services.

Concern about setting up a sophisticated local-area network prompted Dwayne Walker to consider several purchasing avenues, including buying from manufacturers, retailers or value-added dealers. "I didn't look at price so much as technical support," says Walker, manager of office automation for the information systems group of TRW, Inc. Walker recently purchased a local-area network for the group's Long Beach, Calif., site, where 60 personal computers will be linked.

The office automation manager says he steered away from manufacturers because they couldn't offer him alternatives. "Manufacturers have a real narrow view." But, on the other hand, Walker adds, retail computer outlets provide limited technical advice. "You find a guy who's selling networks, and a year ago, he was selling used cars," he says. "I belong to a lot of corporate users groups, and the consensus is if you have the technical savvy in-house, you can go to a retail store."

In evaluating value-added dealers, Walker found three who had between one and two years of experience installing networks and a fourth with six years of experience. He opted for the supplier with the most experience.

Although Walker shied away from manufacturers, Alison Knott says she has been quite satisfied with her direct relationship with Proteon, Inc. As the manager of information systems at MIT's medical department, Knott began shopping for a network three and a half years ago. With the help of a consultant, she chose Novell, Inc.'s Netware to run on Proteon's Pronet.

Knott says her choice of resellers was limited at the time. Because her company is close to MIT's Cambridge campus and because the network manufacturer is a Novell distributor, Proteon was the obvious choice. Knott has since bought additional network products through distributors, but says she's had problems going that route.

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"The problem is that all the [resellers] are young and growing very fast. The technology is so new, it's difficult for them to be experts." Although resellers are user-oriented, Knott says she believes they do not know the technology as well as the manufacturers.

Although value-added dealers and retailers sell a range of network products, they often focus on only a few core products. Paul Griendling, president of Micro One, Inc. in Dallas, has made Novell's Netware the heart of his network line. "I approach the business from a software standpoint. I'm not hardware-loyal at all," Griendling says. He advises users to shop first for net operating software, claiming almost any hardware will do.

Value-added dealers and retailers generally help customers design their own networks and then install them. They put the network boards into the micros and make sure all devices are connected to the network. They also bring up the network operating software, set up accounts on the network, partition the server's disk drive and run diagnostics. Many will even bring up a user's applications and develop a front-end menu system for them. Value-added dealers generally do little applications development, although some perform custom programming related to the network, such as building menus.

Like retailers, some value-added dealers sell network peripherals, though few carry microcomputers. Three-year-old Micro One, for example, is a direct sales organization selling a range of peripherals, including printers, tape drives, power supplies and modems for networks. The company currently carries networks from Proteon, Gateway Communications, Inc. and Standard Microsystems Corp.

More experienced value-added dealers, such as The Orion Network Solutions Group of Costa Mesa, Calif., which was founded in 1979, have linked local-area networks to private branch exchanges, public data networks and wide-area networks. The Orion Group has done Ethernet-to-satellite connections as well as integrated voice and video on several local-area nets, according to Orion President Dale Cabell.

**Consultants focus on service**

In contrast to value-added dealers, most consultants do not carry products or perform network installation. Typically, they call in a value-added dealer or retailer to do the actual network installation, says Chris Smith, vice-president of consulting and education at Chrina Corp. in Dallas. The firm's service package includes system design and development, selection assistance, implementation support and training.

Applications development is one area where consultants differentiate themselves from other network resellers. Five years ago, Chrina was primarily doing custom coding on IBM mainframes and minicomputers from Prime Computer, Inc. and Hewlett-Packard Co., Smith says. Today, more than 95% of Chrina's work is microcomputer-related, with 90% of that pertaining to networking. "We made a conscious decision to be a network-support vendor," Smith says.

Like consultants, the value-added resellers with clients who need networks often work with value-added dealers or retailers who supply the network hardware and perform installation. Some value-added resellers also sell local-area networks directly, but generally they limit themselves to one or two products.

John McDonald is typical of value-added resellers who have established relationships with value-added dealers and retailers. McDonald is the principal consultant at McDonald Associates, a management consulting firm catering to the legal and medical professions. The firm acts as a broker between clients and network suppliers. It specifies the network, oversees the installation and makes sure all applications run properly.

"I negotiate all prices, all contracts and OK all bills," he says. Recognizing that many users need vertical applications packages, a number of network value-added dealers are forging relationships with value-added resellers as a way to combine expertise. Xmital Data Communications of Sunnyvale, Calif., is currently working with four value-added resellers, according to President William Alderson. Xmital works closely with six Sears Business Systems Centers in Northern California, exchanging leads with this microcomputer retailer.

**Cabling choices**

Retailers and value-added dealers often install wiring, although a number of them call on contractors for more complex installation jobs. Chrina's Smith says there are different ways to price cabling. If the client company is large, it will often have its own technical staff that installs cable. For a smaller client company, Smith buys the network hardware and software from a vendor, and sometimes that vendor will pull the cable.

Finally, the vendor can choose to subcontract a firm to do the cabling work. When an outside source is used, Smith says he gets a fixed price for his client before the work is begun.

Cabell says Orion does 95% of its own cabling with its own contractor for $100 per node or location. A location is any point at which the device can be attached to the network, similar to an outlet or wall jack. He says he offers discounts of $70 per node or location for client companies with more than 100 locations. When Cabell uses a subcontractor, he may charge a higher fee. The more middlemen involved, the higher the price goes and the more difficult it is to meet deadlines.

Cabell says one more option for customers is union labor, which can cost as much as $500 per node or location. The customers that go for union contracts are usually big unionized shops themselves.

**Training and maintenance**

Training of local-area network users and systems administrators is generally handled by each supplier individually. Reseller Xmital provides presale seminars to educate key company people about the various types of networks available. Independent retailer Clancy-Paul, Inc. in Cranbury, N.J., offers on-site training and charges an hourly rate. Micro One offers a two-day training class for system supervisors where a training network is set up in a conference room. Only after training is completed does this value-added dealer install the local-area network.

Although value-added resellers and consultants may handle training, they fall back on value-added dealers or retailers for maintenance and service. Standard service offerings include contracts that guarantee four-hour response time, but some resellers provide additional services.

Clancy-Paul recommends that all the hardware on a network be under one service contract. Recently, this retailer began offering its own contract that covers both hardware and software.

**Retailers expand support**

Many consultants, value-added resellers and dealers assert that retailers don't have the technical expertise necessary to sell local-area networks. "With a network, it's not like supporting personal computers," Alderson says. "It's like supporting a minicomputer. It involves more than just hardware; it involves data management."

McDonald says retailers know they're in trouble. On the other hand, for dealers to succeed in this arena, he says they need to set up a department devoted to networking. Following this cue, Clancy-Paul set up a Technical Consulting Services group last summer to service its five stores. Clifford Wilson, the group director, has become the dealership's in-house network expert by attending technical training sessions sponsored by IBM, 3Com, Novell and other manufacturers. In addition, Clancy-Paul is among the dealerships that have built outside sales forces in an effort to gain market share of the corporate users' network business.

Jim Smith, president of Security Pacific Computer Systems, Inc. in Los Angeles, agrees that corporate buyers are more open to retailers now that dealerships have outside representatives. Because his organization has a lot of technical expertise, Smith opted to buy 43 local-area networks through a local retailer with whom Security Pacific has a good relationship. Smith says users get better support from vendors with whom they have ongoing business relationships. He added that he would steer away from value-added dealers and value-added resellers who get a user's business once and have no commitment afterward.

National retail chain Micro Age Computer Stores, Inc. is another dealership focused on outside sales that is making a concerted effort to build networking expertise, according to Greg Leveille, manager of advanced systems marketing. The Tempe, Ariz.-based chain first began selling networks in 1982. Currently, 75 out of 170 stores sell networks, Leveille says.

Although the mix of products, installation practices and user training vary from one Micro Age store to another, Leveille says all the Micro Age stores have the same access to support materials provided by Micro Age headquarters. These include a reference guide containing chapters on the competitive analysis of networks and configuration examples. In addition, all stores receive a monthly technical support journal that details product evaluations and reported problems.

Despite retailers' attempts to bolster their technical images, many first-time local-area network buyers are still shopping for a supplier with more expertise. "You're buying a distributor, not a manufacturer. You get zero support from a manufacturer, so make sure the distributor you go with has been successful in installing networks," says Dennis Bosch, manager of employee benefits consulting for Peat, Marwick, Mitchell & Co. in Los Angeles.

In the long run, a distributor can affect whether the user gets the most out of the network by keeping the user informed of new hardware and software developments, Bosch says. "Your distributor is your lifeline," he says. "It's not like you can go down to the local Chevrolet dealer and see what's happening. If your dealer is busy or lazy, you're sitting out in the cold."

Talking to other network users who have a similar application can provide insight into products as well as suppliers, says Larry Elizondo, director of operations at Azuray, Inc., a Scotts Valley, Calif., maker of graphics systems. Elizondo says he went through an exhaustive search before setting up a local-area network to run a manufacturing requirements planning system.

First, he contacted network manufacturers for names of their local distributors. Next, he called each distributor and asked for the names of at least two of their customers. In talking with 14 network users, Elizondo found that poor service was the biggest complaint. This input, coupled with his own experience, steered Elizondo away from retailers and toward a value-added dealer that had ties with several vertical applications developers. He says he would definitely stay away from retailers for certain specialized applications such as manufacturing requirements planning.

Both users and resellers alike overwhelmingly recommend that network shoppers visit at least one customer site before committing to a particular network product or reseller. "You should even be willing to jump on an airplane, if you have to," TRW's Walker says.

Finding a network supplier is like finding a good car dealer; most network buyers rely on word of mouth. The key is to match the supplier's support with the buyer's level of expertise.

▶ APPLICATION

# Paint by computers



## *PPG's net improves the productivity picture at 11 factories worldwide.*

**BY MICHAEL SHEEHAN**
Special to Network World

PPG Industries of Pittsburgh, one of the world's largest manufacturers of paints and coatings, produces thousands of products used by many industries, including the automotive and appliance industries. With coatings sales in 1985 reaching $1.5 billion, the company needed a network that would provide more timely information, increase shop-floor productivity and improve inventory management.

In response, PPG's Coatings & Resins Group developed a 13-node computer network to link its corporate headquarters with on-line production systems located at 11 factories throughout the U.S., Canada and the UK.

"At PPG, we manufacture paints, including the Pittsburgh Paints consumer line, automotive coatings used on more than 60% of all cars built worldwide, industrial products such as appliance and can coatings, and chemicals and glass products," says Robert Bruner, director of Information Services for PPG's Coatings & Resins Group.

"Each coatings factory uses about 7,000 active formulas to produce 2,000 products, many of which are custom-made. Since raw materials account for approximately 85% of our manufacturing costs, we need to manage inventory tightly and closely track each product through the production process to maintain profitability," Bruner says. "Our on-line computer network gives us the control and performance necessary to achieve this goal."

*Sheehan is a technology writer based in Saratoga, Calif.*

The network, which uses computers from Tandem Computers, Inc. of Cupertino, Calif., provides inventory recording capabilities. These functions can track the cost and materials used in each manufacturing step, log which products have been produced and stored and oversee retrieval from inventory for final shipment.

To get this information to and from the factory floor, foremen and shop schedulers use on-line terminals located in administrative offices at the manufacturing facilities. Workers enter information into the central data base when goods come into a receiving dock, when raw materials move out of storage and into production and when completed products are transferred from a filling location.

"Any inventory movement in or out of an area is captured by the system," Bruner says. "Although we do not require support of the Manufacturing Automation Protocol (MAP), we are in the process of investigating the communications standards issue very carefully." According to Bruner, Tandem equipment has passed the Industrial Technology Institute's MAP conformance tests for the data link and transport layers of the International Standards Organization's seven-layer Open Systems Interconnect model.

### Creation of formulas

The PPG network also handles accounting and invoicing, production of manufacturing batch tickets, sales forecasting and technical functions, such as the creation of product formulas. In some instances, PPG creates formulas for coatings at central research centers. The formulas are then distributed by the network to different manufacturing facilities. Other formulas are developed at plant sites using the centrally controlled materials data base, which governs information such as labeling requirements and health and safety features.

"We develop a core application in Pittsburgh, then send out the object code, installation instructions and documentation for Help files over the network's 96K baud, digital private leased lines to selected plants," Bruner says.

"Overall, the networked system allows us to optimize order scheduling and the production cycle of different products to make better use of inventory," he continues. "For example, if several customers place orders that total 100,000 gallons of red leaded paint, we can now evaluate our overall order backlog and produce all the batches of paint together, instead of making 5,000 gallons today and 5,000 gallons a week later. Only afterward do we need to split up the paint for shipment to the different customers. By providing visibility into the ordering cycle, the system has significantly increased the efficiency of our operations."

In addition, PPG is installing a major order entry and inventory management system for the automotive-refinish coating product lines that will bring 26 warehouses on-line. The pilot setup involves testing an inventory inquiry application at six locations.

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"Our objective is to achieve a 3-to-4-second response time. But the application is running slower than that over the network, so we still have to shake out some problems," Bruner notes. "The main order entry application we are working on is designed to allow a person at the warehouse to enter a customer's order directly into the terminal while talking on the phone. As a result, we need a response time of 1.5 seconds, which means the network really has to hum."

**System upgrade**

The PPG network runs on Tandem computer systems that are linked by Tandem's Expand data communications network software. Each node in the network can consist of two to 16 processors, while up to 255 systems, or 4,080 processors, can be connected in a network. All of this appears to the user as a single operating system.

PPG initially installed two-processor Nonstop II systems at 10 U.S. factories as well as at its general office in Pittsburgh. Recently, the company upgraded and expanded the network to include eight three-processor and two four-processor Nonstop TXP computers. The Coatings & Resins Group will continue to use these computers in addition to a nine-processor development system at headquarters.

Prior to selecting the Tandem systems, PPG carried out a lengthy evaluation that included a nine-month analysis of other major vendors' systems. Key factors in the final decision included cost, performance, modular capacity and networking software capability.

"PPG selected Tandem equipment for three reasons: networking capability, availability of software development tools and expandability," Bruner explains. "Some vendors we looked at did not have a true peer-to-peer network capability, and in some cases, their networking software was just too complex for us to use effectively."

"Another factor in our final decision was that Tandem's Pathway software deals with many issues that, in other vendors' worlds, the user must handle. It offers terminal management capability. And the relational data base and inquiry tool enable us to run directly against operational data, not an abstracted version. With some other vendors' systems, the physical structure of the data base prohibits the operator from using a generalized query package."

> *"PPG initially installed two-processor Nonstop II systems at 10 U.S. factories as well as at its general office in Pittsburgh. Recently, the company upgraded and expanded the network to include eight three-processor and two four-processor Nonstop TXP computers. The Coatings & Resins Group will continue to use these computers in addition to a nine-processor development system."*

**Pilot test meets the requirements**

Following the evaluation process, the company purchased a small Tandem system and pilot tested three applications — including a prototype of the order entry and shipping module — to verify the ability to use the software across the network and implement an on-line system. The final decision to go ahead with the Tandem equipment was made when the tests successfully met PPG's requirements for system development speed and ensured management that nonsystems personnel could use the Enform inquiry product effectively.

"We formerly handled many functions in a batch mode, which limited our ability to respond to customer inquiries about when a product would be shipped because some data was up to a month old," Bruner explains. "Now, through the network and more timely inventory management, that information is available and accurate."

Furthermore, the network provides the coatings group with the ability to look at all its factories from time to time as if they were one plant. This permits headquarters personnel to examine the total corporatewide inventory as a single unit instead of 10 smaller inventories.

"Each factory currently manages its own receivables for selected products," Bruner says. "The computer allows accounting personnel at headquarters to query against both financial and manufacturing data at each site. They can view the independent data centers from a central point and then consolidate the information. This lets them gain a better understanding of precisely what's going on at each location and keep track of any problems that need to be dealt with — all without relying on human intervention."

Another feature, Safeguard security software, will also soon be implemented. The package provides comprehensive file access security, allowing only selected individuals with assigned identification codes to obtain information at the remote nodes. The software also offers additional dimensions of networkwide security related to audit trails and other monitoring functions that are important to PPG. These functions include device protection and auditing, file creation control and auditing, auditing of user authentication, process creation and deletion control.

**Future expansion**

During the coming months, PPG will continue to expand the system as new software applications are brought on-line for use throughout its North American facilities. On an international scale, the company has started to adapt its systems to operate in five European countries.

"We are bringing up a Tandem-based installation in the UK," Bruner says. "In the future, we plan to expand use of the equipment to include manufacturing plants located in West Germany, France, Italy and Spain."

"Our objective is to provide systems that offer users a cultural interface, one that works within the cultural context of the individual," Bruner says. "The strategy is to develop a user profile. When someone logs onto the system, we will know what language and culture they wish to deal in."

> *"PPG hopes to facilitate installation of systems in non-English speaking nations."*

In the future, the company hopes to facilitate installation of systems in non-English speaking nations by having instructions and help screens appear in the language of the country where the system is located. PPG is also studying the issues of transborder data flow and interconnectivity between countries, but foresees no significant technical problems. ☐

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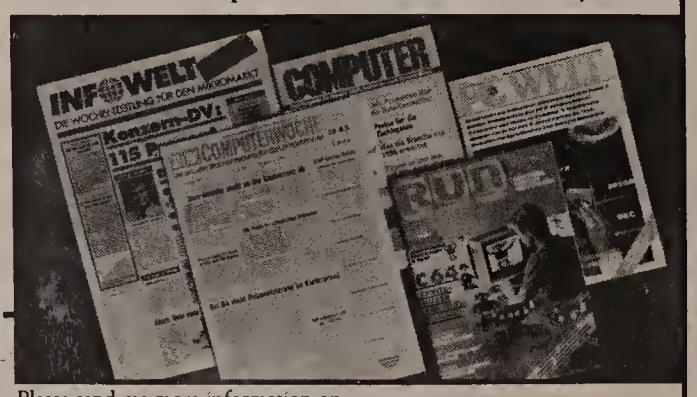
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# PRODUCT FOCUS:
## Packet assembler/disassemblers

▶ CONTINUED FROM PAGE ONE

# The packet racket

*Users are launching PADs as a low-cost solution to concentrating net traffic.*

by reducing the number of transmission lines and ports needed to access public or private packet-switched networks. PADs also provide network management and control by enabling customers to stipulate which users and devices have access to the network, to keep track of network use for billing and to troubleshoot the network from a central site.

As the name implies, PADs perform a packaging function. They are used to connect terminals, hosts and other nonpacket-oriented data devices to X.25 packet networks. PADs can multiplex anywhere from four to 128 devices over one or two X.25 network links.

PADs take data generated from an attached data device, assemble it into packets, interleave these packets with packets from other devices and shuttle the multiplexed packets out to the network. Once within the network, each addressed packet seeks the best route to its destination.

Packets coming in from the network are disassembled, converted into the protocol of the sending device and delivered to the appropriate port as asynchronous characters or as a synchronous bit stream.

The device side of the PAD is essentially what distinguishes one PAD from another. They differ in the protocols and number of ports, security, user friendliness and, perhaps most important, management capabilities. On the network side, most packet-switching PADs support X.25, the CCITT standard that has become synonymous with packet network technology.

A packet-switching network is like the U.S. postal system. A network is composed of geographically dispersed switching nodes, which are analogous to local post offices. These switching nodes are interconnected by dedicated telephone lines, similar in function to the trucks, trains and planes used to carry mail between cities. Information is routed through both systems in addressed packages.

Compared with point-to-point or multidrop leased-line data networks, packet networks are less expensive, more reliable and less error-prone. As with the postal system, sharing transport and sorting facilities among many customers reduces costs. And both systems are reliable because the customer will not notice a total outage if any one package, transport link or sorting center is lost.

Packet networks limit data errors through the use of an acknowledgment system that ensures error rates as low as one error for every trillion bits transmitted. PADs are used with public and private X.25 packet nets. Public packet networks, also known as public data networks or value-added networks, include carriers such as GTE Telenet Communications Corp., Tymnet/McDonnell Douglas Network Systems, Inc. and US Telecom Data Communications Co. These companies also sell private nets, as do others such as BBN Communications Corp. of Cambridge, Mass., Dynatech Packet Technology, Inc. and the Burlington, Mass.-based M/A-Com Telecommunications, Inc.

PADs are an integral part of most private packet networks. They are not, however, a necessary component of public networks. Public data networks are usually accessed through dial-up links or, where traffic makes it viable, through

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From **page 37**
a dedicated link. In such cases, the carrier's network node provides the PAD function. For even heavier traffic loads, a PAD can be installed at the customer's site. This provides a multiplexing function and reduces the number of telephone links needed to the carrier's network node.

The justification for PADs in both public and private networks is the same. Typically, it is a matter of weighing the cost of the PAD, which can range from $200 to $600 per port, against the savings that can be realized by reducing the number of network links and ports needed. It is difficult to place a value on savings realized from the management control that PADs provide to both types of networks.

System vendors — manufacturers that sell the switches, PADs and control equipment needed to build an entire network — have the opportunity to offer the highest degree of network control and management because they can put the user in charge of all the pieces. Vendors of PADs used in public data networks have less to work with but can still offer users a new degree of control, such as problem determination, filtering of users and usage statistics.

An important PAD feature is the ability to change its characteristics both locally and remotely, PAD ports can be configured for speed, error conditions, traffic priorities and mnemonics (the ability to request access to a device by name instead of by its alphanumeric network identifier).

If a communications manager changes a host and its associated network address, he must then update the mnemonic addresses in each PAD that deals with that host. Although this can usually be updated locally through a supervisory port, the manager should ideally be able to do this as a batch job from a central location.

An often-overlooked PAD consideration is whether the PAD can be configured on-line. Some PADs have to be taken out of service to reconfigure one port, according to Bill Simmelink, director of marketing at M/A-Com.

Certain manufacturers, including M/A-Com, load PAD configuration tables when they are turned on from a central data base. Like M/A-Com's boxes, such PADs should be capable of automatically seeking out a configuration and alerting the central network management device or control center of its presence.

As a rule, vendors of PADs that work with public networks provide PAD management with a personal computer-based tool. Although less elegant than the system vendors' approach, this tool still provides public network users with more control than they previously had.

Besides management features, the quickest and dirtiest way to measure PADs is through the link speed and number of ports supported, according to Bob Boughton, senior product manager with Dynatech Packet Technology, maker of the Dynapac family of packet-switching products. The PAD should combine a network link of the appropriate speed with the right number of device ports. It should also be able to put data into packets quickly enough so as not to be in the way.

Although some vendors talk about their products in terms of packet throughput per second, the definition of this benchmark is ambiguous enough to render it useless. Companies that bother to gauge packet throughput for marketing purposes may be talking about different protocols, presuming light or heavy traffic and doing their cacu-
lations with different size packets.

Most PAD vendors typically use 128 character packets, according to Bob Dye, product line manager at BBN, a Cambridge, Mass.-based manufacturer of packet-switched networks. A 9.6K bit/sec X.25 network link will only be able to support roughly 10 of these packets per second.

This throughput is adequate for asynchronous terminal communications, where characters are created as quickly as the user can type, but it is lacking for personal computers capable of transferring long files and for synchronous communications.

Synchronous terminals are capable of building screens of data of up to 2,000 characters and dumping the data onto the PAD all at once. To avoid response time delays, the PAD and the speed of the X.25 network link must be capable of handling more than 10 packets per second. In general, synchronous PADs support higher packet throughput and network links of 19.2K bit/sec or 64K bit/sec.

Response delays have limited use of packet-switching technology in the synchronous communications environment typified by IBM's 3270 Binary Synchronous Communications and Synchronous Data Link Control protocols.

"Packet switching noticeably degrades performance for IBM 3270-type traffic when compared with leased lines," according to John King, an independent consultant in Carmel, Calif. "You can't get around the fact that you're breaking data up and shipping it in small pieces. There is an inherent delay."

Although packet switching is still seldom used in the synchronous communications world of mainframe computers, there are ways to minimize response delays, according to BBN's Dye.

The traditional manner is to "trick" hosts attached to packet nets into thinking they are polling remote controllers along a multidrop line. In reality, host polls are answered locally by a PAD that keeps the poll from transversing the network.

Remotely, PADs poll attached terminal controllers as if they were the host. The duped controllers, in turn, poll their terminals in the normal fashion. When data is ready for transmission, the terminal-side PAD gathers it up, packets it and sends it to the host PAD. The host PAD answers the next host poll with the data.

Protocom Devices, Inc., a three-year-old New York-based network company, claims its synchronous PADs provide even better response time than the deception method. According to Gene Gaines, executive vice-president of planning, Protocom limits delays by establishing an end-to-end session between devices. This enables the PAD to dispatch data to the host as it arrives, instead of waiting until the whole transaction is received.

Polling in synchronous environments contributes to the difference in the number of device ports on asynchronous and synchronous PADs. Asynchronous PADs support one device per port. Ports on synchronous PADs, however, can each support a multidrop line, with each drop capable of supporting a controller and its associated cluster of terminals. In theory, a four-port synchronous PAD may support more than 100 terminals.

> *"Discerning users should carefully weigh differences in price against features and should avoid grabbing the lowest cost box."*

Besides supporting multidrop lines, some synchronous PADs provide X.25 concentration. GTE Telenet's TP3-3325, for example, has four X.25 concentration ports that can be used to connect directly to devices with X.25 interfaces or to support cascades of other GTE Telenet TP3 PADs.

These differences make it plain that there is more to shopping for PADs than meets the eye. Discerning users should carefully weigh differences in price against features and should avoid grabbing the lowest cost box. Moderately heavy users of public data networks interested in implementing PADs should plan with an eye to the future. At some point, there is an economic crossover where the installation of a private or hybrid packet network makes sense. Hybrid networks combine private networks, which are installed in areas with heavy traffic concentration, with public services to create nationwide networks. Smart buying will limit the risk of making PAD investments obsolete.

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| Company | Product name | Asynchronous/ synchronous | Number and maximum speed of ports | Number, type and maximum speed of network link | Multidrop line support | Network management: Local user ID password | Network management: Host access control | Network management: Local mnemonic name translation | Network management: Diagnostics | Price |
|---|---|---|---|---|---|---|---|---|---|---|
| GTE Telenet Communications Corp. Reston, Va. | TP3/II-3005 | asynchronous | 4 or 8 9.6K bit/sec | 1 dial or leased 19.2K bit/sec | does not apply | ✓ | In conjunction with access management system | for GTE Telent Mail System and approximately 10 others | TP5 Network Management System | 4 ports = $625/port 8 ports = $437/port |
| | TP3/II-3010 | synchronous IBM 3270 BSC, SDLC, 2780/ 3780 | 2-26 9.6K bit/sec theoretically capable of supporting 256 devices | 1 dial or leased 19.2K bit/sec | ✓ | ✓ | In conjunction with access management system | for GTE Telenet Mail System and approximately 10 others | TP5 Network Management System | $420/port fully configured |
| | TP3/II-3325 | asynchronous IBM 3270 BSC, SDLC, 2780/ 3780 | 2-26 9.6K bit/sec | 1 dial or leased 19.2K bit/sec | ✓ | ✓ | in conjunction with access management system | for GTE Telenet Mail System and approximately 10 others | TP5 Network Management System | $495/port fully configured |
| BBN Communications Corp. Cambridge, Mass. | C/10 | asynchronous | 8-64 9.6K bit/sec | 2 dedicated 64K bit/sec | does not apply | ✓, or in conjunction with access management system | in conjunction with access management system | ✓ | from central control center | $250/port |
| | C/10 | synchronous | 4-32 19.2K bit/sec | 2 dedicated 64K bit/sec | ✓ | ✓, or in conjunction with access management system | in conjunction with access management system | ✓ | from central control center | $500/port |
| M/A-Com Telecommunications, Inc. Burlington, Mass. | CP-9600 | asynchronous | 8 9.6K bit/sec | 1 or 2 dedicated 19.2K bit/sec | does not apply | | ✓ | ✓ | minicomputer-based central system | na |
| | CP-9600 | synchronous IBM BSC, SDLC, 2780/3780 | 3 19.2K bit/sec up to 32 controllers | 1 or 2 dedicated 19.2K bit/sec | ✓ | | ✓ | ✓ | minicomputer-based central system | na |
| Amnet, Inc. Watertown, Mass. | Nucleus 6000-N6020-20 | asynchronous | 6-16 9.6K bit/sec | 2 dial or leased 56K bit/sec | does not apply | option | in conjunction with network | ✓ | na | $300/port |
| Dynatech Packet Technology, Inc. Alexandria, Va. | Multi-PAD X.25 | asynchronous | 4-16 9.6K bit/sec | 1 dial or leased 56K bit/sec | does not apply | ✓ | In conjunction with directory access control system | ✓ | small packet network control center | 4-port unit = $2,205 8-port unit = $3,415 12-port unit = $4,595 16-port unit = $5,550 |
| Digital Communications Associates, Inc. Norcross, Ga. | X.25 PAD | asynchronous | 2-32 9.6K bit/sec | 1 dial or leased 19.2K bit/sec | does not apply | | provided at network level | ✓ | na | $300-$400/ port |
| Paradyne Corp. Largo, Fla. | 5220-50 Virtual Interface Processors | synchronous IBM SDLC | 3 19.2K bit/sec maximum theoretical number of devices is 256 | 1 dial or dedicated 64K bit/sec | ✓ | ✓ | function of network | ✓ | personal computer network-based | $5,700/ device |
| Protocom Devices, Inc. New York | P250 | synchronous IBM 3270 BSC, SDLC, Sperry Uniscope, Burroughs Pull Select, DEC DDCMP | 40 9.6K bit/sec each port can supporting 40 devices | 1 dedicated 9.6K bit/sec | ✓ | ✓ | five levels of security | ✓ | ✓ | na |
| Micom Systems, Inc. Simi Valley, Calif. | MB2 | asynchronous | 4-16 9.6K bit/sec | 1 dial or dedicated 9.6K bit/sec | does not apply | ✓ | | ✓ | X.25 control center | 16-port device = $4,290 |
| Wolfdata, Inc. Chelmsford, Mass. | PMC-Plus | asynchronous | 8-48 9.6K bit/sec port-to-port switching | 1 or 2 dial or dedicated 64K bit/sec | does not apply | ✓ | | ✓ | software program for a personal computer | $200-$300/ port |
| NCR Comten, Inc. St. Paul, Minn. | X.25 Private Network System | asynchronous | up to 128 9.6K bit/sec | 1 or 2 dial or dedicated 19.2K bit/sec | does not apply | ✓ | in conjunction with network | | network control center PAD interface | does not apply; PAD switch is resident |
| | 3270 Display System Protocol PAD | synchronous IBM BSC, SDLC | up to 128 9.6K bit/sec | 1 or 2 dial or dedicated 56K bit/sec | ✓ | | in conjunction with network | ✓ | network control center PAD interface | does not apply; PAD switch is resident |

na: not available

▶ SYSTEM SECURITY

# Protect your local net

**BY MARGIE SEMILOF**
Senior Writer

One important element most users fail to consider when implementing a local-area network is security. That carelessness could be costly.

Security flaws in a local-area network could leave vital payroll, personnel and other confidential information vulnerable to unwarranted use by people with simple password access to the system.

Robert Johnston, director of data processing for the Phoenix Mutual Life Insurance Co. in Hartford, Conn., said most users do not realize security is as important for local-area nets as it is for their mainframe counterparts. Management introduced personal computers and networks into offices to free employees from mundane manual chores.

But, he said, information once kept confidential in locked filing cabinets is now openly accessible to a wide range of users on a local-area network.

"If you use the network for such things as personnel data and payroll information, the network must be secured by protective software," Johnston said.

"Trying to veil confidential information so it doesn't appear confidential is sheer folly."

"Users assume no one will find a confidential file if they do not know the file's name," he added. "But you only have to browse a little. Most companies are concerned about outside hackers. But outsiders may not be the greatest security threat."

Some network security officers — a rare breed today — claim the ease of use of microcomputer software and the lack of stringent security features built into personal computer packages are partly to blame for the weakness of local-net security.

Network software is usually designed to help users work with a minimum of DP knowledge and, in most cases, is ill-prepared to prevent intentional, unauthorized access.

Rolf T. Moulton, corporate information security advisor for the Cleveland-based Standard Oil Co. OH Corp. and author of *Strategies and Techniques for Preventing Data Loss or Theft*, pointed out that users have easy access to micro data, a situation quite different from users of host-based networks, who are accustomed to tough security systems based on access-control software.

In addition to network security flaws, users routinely store sensitive data on diskettes left in unlocked areas or in looseleaf binders. Those disks or binders are available to intruders or subject to damage.

"To increase local-area network security," Moulton said, "managers must accept the security task as a personal responsibility. Do not wait for your organization to issue guidelines."

In his book, Moulton also advised users to educate staff about micro security, provide adequate locked storage space for diskettes and isolate restricted material from other office information on the network.

Diskettes should be labeled according to security classification, and back-up copies should be stored. Diskettes containing obsolete or unnecessary data should be erased.

Few large companies believe in the necessity of creating a corporatewide security policy for local-area networks, Johnston said. As a result, most corporations are unlikely to initiate a program for network security as a preventative measure.

"Most security work is in reaction to a specific incident or threat," he said.

"Communications managers must convince senior management of the importance of security," Johnston added.

"The best way to demonstrate the vulnerability of a network is to give an executive a microcomputer. If a senior manager sees how easy it is to erase a file or how vulnerable the hard disk data is, he will be more supportive."

Johnston said users should sort out their most important information assets and calculate the biggest threats to those assets.

Users must also decide if risks or threats to data integrity are likely to occur. Finally, the user should weigh the cost of minimizing security threats.

"The questions to ask regarding local-network security are the same as other office security," Johnston said.

"The difference with personal computers and micros is there is less central control over those devices than in mainframe networks. The best advice is to avoid putting anything sensitive on the network."

▶ USER SURVEY

# Funds transfer nets to cash in on ISDN

**BY JIM BROWN**
New Products Editor

WELLESLEY, Mass. — Operators of major electronic funds transfer networks will probably be the first to embrace integrated services digital network technology, according to the findings of a recently released survey of electronic financial services providers.

The survey, "Electronic Delivery Systems for the Financial Services Industry: Opportunities in Telecommunications," conducted by Telematics Resource Group, concludes there are about as many expectations concerning ISDN technology as there are network operators in the electronic financial services field. Operators of large-scale funds transfer networks, the survey states, expect to benefit from ISDN's promised integrated access to broadband digital data services transmitting information at rates up to 64K bit/sec. Such users include banks, large corporations, securities exchanges and securities brokerage houses.

However, while major electronic funds transfer network operators are giving ISDN more than just a curious glance, those involved in operating automated teller machine (ATM) networks couldn't care less about ISDN. The survey found that ATM network operators are happy with high-speed analog lines.

The survey, which is available for $3,950 per copy, also concluded that providers of automated financial quotation services are not likely to embrace ISDN, because they increasingly are relying on alternative data transmission services such as FM radio subcarriers, vertical-blanking intervals of television broadcasting and very small aperture terminals. Those transmission services, the survey found, are luring more financial quotation services away from telephone networks.

**ISDN** from **page 31**
somewhat redundant systems in order to achieve reliability is a time-honored practice in the U.S. One of our culture's most basic aphorisms — don't put all your eggs in one basket — still applies. In Europe, all ISDNs are in the PTTs' basket. Users should stay abreast of European ISDN developments as they prepare for ISDN in the U.S.

It doesn't matter that ISDN is still a long way from reality, that non-ISDN services are available, or that there are a million issues to resolve. The standard will be important. Users who say ISDN stands for "I sure don't know" are the defensive ones with their heads buried in the sand.

There is some truth to the notion that integrated services digital network should be called digital network integrated services; work on implemention of the digital network is underway now. The integrated services will come in the future.

**Con** from **page 31**
nications requirements by allowing for the addition of video teleconferencing, voice intercoms and terminal-to-host links.

In contrast, traditional minicomputer topology requires all terminals to be directly wired to the mini via point-to-point circuits. Each time a terminal is relocated, the old cable is usually abandoned and a new cable is run to the new terminal location. This quickly results in congested cable with bundles of unused wire. Relocating a computer facility in this setup is costly and time-consuming. With broadband cable in a personal computer local-area net, computers can be easily moved.

Because personal computer networks accommodate differences in departmental local-area networks, many existing multivendor networks can be integrated to provide an organizational network with total connectivity and access to minis and mainframes.

By themselves, personal computers are useful tools for the information industry. Linked into local-area networks, personal computers become corporate assets that not only surpass the mini in performance and cost-effectiveness, but also accommodate connections to minis and mainframes as corporate needs dictate. In so doing, they carry distributed processing to its logical conclusion.

**Pro** from **page 30**
powerful tool when configured as a communications gateway. Even in a world of increasing standardization, there are many incompatible protocols and networks. Through its multitasking capability and multiple connection alternatives, the departmental processor can become a gateway to other environments. An example would be a gateway to a Systems Network Architecture or Manufacturing Automation Protocol environment from an Ethernet local-area network.

The departmental minicomputer can also act as an information gateway, which is a special-purpose communications gateway that provides not only connectivity but value-added functions. The information gateway provides document conversion facilities between incompatible formats such as Document Content Architecture and Teletex.

These are just a few examples of how departmental minicomputers of various sizes and functions fit into a typical business environment. Data General Corp.'s view is an "enterprise" view — that is, there are many roles departmental computers can play in an organization, but more importantly, departmental systems mirror the way most companies are structured.

Personal computing can provide aggregates of productivity, but in conjunction with departmental computing, it delivers true productivity, allowing a company to do business more efficiently and more effectively, without sacrificing the way it does business.

# NETWORK WORLD

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**1** **My primary areas of activity.** Circle ONE only.

I am involved in evaluating communications (data, voice and /or image) products and services:

1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both

**a** **For communications, my primary responsibility is:** Circle ONE only.

1. Data Communications
2. Voice Communications
3. Both

**2** **Circle only the ONE title classification which most applies to you.**

**Company Management**

11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CIO, VP, Dir. Head of Finance, Admin. Procurement

**Communications Management**

*Data Communications*

21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff
Supervisor, Head : Networking, Design, Analysis, Engineering, R&D, Applications, Services

*Telecommunications*

31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks. Engineering, Design, R&D, Application Development
32. Supervisory/Staff
Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

*Factory Communications*

41. Management
42. Supervisory/Staff

**MIS/Data Processing**

51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of System Design, Analysis, Applications

**Others**

75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other _____

**3** **Job Function**

**Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products?** Circle ONE only.

**Corporate**

1. Business Management, Planning and/or Development

**Communications System/Network**

2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other _____

**4** **Which one of the following best describes the primary business activity of your organization at this location?** Circle ONE only.

**Consultants**

11. DP/Communications Consulting Services
12. Consulting Services (except DP/Communications)

**End Users**

13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/Construction/Petroleum Refining/ Agriculture/Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

**Vendors**

41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other _____

**5** **In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services?** Circle ALL that apply.

1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

**6** **Check ALL that apply in columns A and B.**

A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:

B. These products and services are presently in use at this location:

| A | B | *Product/Services* |
|---|---|---|
| | | *Computers* |
| ☐ | ☐ | 01. Micros |
| ☐ | ☐ | 02. Minis |
| ☐ | ☐ | 03. Mainframes |
| | | *Data Communications* |
| ☐ | ☐ | 04. Communications Processors |
| ☐ | ☐ | 05. Comm./Networks Software |
| ☐ | ☐ | 06. Digital Switching Equipment |
| ☐ | ☐ | 07. Facsimile |
| ☐ | ☐ | 08. Modems |
| ☐ | ☐ | 09. Multiplexers |
| ☐ | ☐ | 10. Protocol Converters |
| ☐ | ☐ | 11. Network Mgmt. & Control |
| ☐ | ☐ | 12. Test Equipment |
| ☐ | ☐ | 13. 3270 Controllers |
| | | *Telecommunications* |
| ☐ | ☐ | 14. PBXs |
| ☐ | ☐ | 15. Key Systems |
| ☐ | ☐ | 16. Central Office Equipment |
| ☐ | ☐ | 17. Integrated Voice/Data Terminals |

| A | B | *Product/Services* |
|---|---|---|
| | | *Transmission/Network Services Equipment* |
| ☐ | ☐ | 18. Microwave |
| ☐ | ☐ | 19. Satellite Earth Stations |
| ☐ | ☐ | 20. Local Area Networks |
| ☐ | ☐ | 21. Wide Area Networks |
| ☐ | ☐ | 22. Packet Switching Equipment |
| ☐ | ☐ | 23. Fiber Optic Equipment |
| | | *Communications Services* |
| ☐ | ☐ | 24. Packet Switching Services |
| ☐ | ☐ | 25. Cellular Mobile Radio Services |
| ☐ | ☐ | 26. Electronic Mail |
| ☐ | ☐ | 27. Enhanced Services |
| ☐ | ☐ | 28. Centrex |

**7** **Estimated value of communications systems, equipment and services:**

A. which you helped specify, recommend or approve in *last* 12 months? Check only ONE in column A.

B. which you plan to specify, recommend or approve in *next* 12 months? Check only ONE in column B.

| A | B | | A | B | |
|---|---|---|---|---|---|
| ☐ | ☐ | 1. Over 10 million | ☐ | ☐ | 6. $100,000-250,000 |
| ☐ | ☐ | 2. $5-10 million | ☐ | ☐ | 7. $50,000-100,000 |
| ☐ | ☐ | 3. $1-5 million | ☐ | ☐ | 8. Under 50,000 |
| ☐ | ☐ | 4. $500,000-1 million | ☐ | ☐ | 9. Don't know |
| ☐ | ☐ | 5. $250,000-500,000 | | | |

**8** **Estimated gross annual revenues for your entire company/institution:**

Circle only ONE.

1. Over $1 billion
2. $100 million to $1 billion
3. $5 million to $100 million
4. Under $5 million

**9** **Estimated number of total employees at this location:**

Circle only ONE.

1. Over 5,000
2. 1,000-4,999
3. 500-999
4. 250-499
5. 100-249
6. 50-99
7. 20-49
8. 1-19

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# "You're filling a long-neglected information gap and doing it quite well."

*Stan DeVaughn*
*Director*
*Corporate Communications*
*Network Equipment*
*Technologies*

NETWORK
EQUIPMENT TECHNOLOGIES

April 4, 1986

Mr. Doug DeCarlo
Publisher
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Dear Doug:

Just a quick note to wish you and your staff well on your new editorial enterprise, and advise you that our current campaign is exceeding expectation. In fact, responses from Network World are better than "book number two" by a factor of eight-to-one.

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Sincerely,

Stan DeVaughn
Director
Corporate Communications

SD:pl

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▶ MAP/TOP NEWS

# User guide set to bow

*Lists current tools.*

**BY BOB WALLACE**
Senior Writer

SEATTLE — The Industrial Technology Insititute (ITI) and the Society of Manufacturing Engineers (SME) have joined forces to publish a Manufacturing Automation Protocol /Technical and Office Protocol (MAP/TOP) product directory distributed to attendees at last week's U.S. MAP/TOP users group meeting here.

The comprehensive listing of MAP- and TOP-compatible products should help users of factory networks get a clear picture of product capabilities. The product directory will be published biannually, beginning in September and again in April 1987.

ITI, an Ann Arbor, Mich.-based independent testing organization, also announced that it will support 24-hour access to the data base containing product information used in the directories. According to Meredith Gremel, editor of the product survey, users can access the data base using a microcomputer or terminal through Compuserve Network Services packet network.

The products outlined in the September issue will be listed in six categories: end-user systems, intermediate systems, OEM products, gateways, network products and network services. Each product listing includes a vendor contact, the protocols implemented and the operating environment specifications. Each listing will also specify which version of the MAP or TOP specifications the product conforms to, whether conformance test reports are available and where those tests were conducted.

Survey information can be obtained from by calling SME at (313) 271-1500. ITI questions should be directed to Meredith Gremel at (313) 769-4109.

**MAP** from **page 2**
factory systems to determine if they are compatible with the factory communications standard.

Joseph Schoendorf, president and chief executive officer of INI, spoke on the state of General Motors Corp.'s five-plant Truck and Bus Division MAP project. He said GM's Truck and Bus plant in East Pontiac, Mich., is currently the world's largest production MAP system.

"The East Pontiac plant uses more than 18 miles of coaxial cable," he claimed. "The two-million square foot plant uses our MAP/One on the factory floor and uses Ungermann-Bass' Net/One local-area network to support communications in its offices," Schoendorf explained.

The East Pontiac plant, which is reportedly designed to produce one truck per minute, operates 24 hours a day, Schoendorf claimed. INI and Ungermann-Bass installed their respective broadband systems in the facility, he said. INI personnel connected all the automobile production equipment to the backbone factory net, Schoendorf said.

Earlier, the rapidly snowballing MAP movement won the support of Proctor & Gamble Co. of Cincinnati. Officials of the company said at the meeting MAP would be the foundation of future factory networks within the process manufacturer's production facilities. The company has informed its major factory equipment suppliers that it will give preference to vendors that supply equipment compatible with MAP.

▶ MAP PRODUCTS

# Tools debut at show

*Bevy of bridges closes MAP gaps.*

**BY BOB WALLACE**
Senior Writer

SEATTLE — The scope of the Manufacturing Automation Protocol (MAP)/Technical and Office Protocol (TOP) equipment marketplace was greatly expanded last week as a variety of vendors debuted MAP and TOP compatible equipment at the U.S. MAP/TOP users group meeting held here.

Concord Data Systems, Inc., of Marlborough, Mass., added a trio of MAP-compatible bridging products to its MAP product line.

The Series 4100 bridges allow users to tie the vendor's Token/Net MAP network, which operates at 10M bit/sec with its carrier-band subnetworks that operate at 5M bit/sec.

The second bridge product supports communications between different channels on a single 10M-bit/sec broadband cable. A third bridge adds wide-area networking capabilities to Concord Data's product line by allowing MAP networks in geographically dispersed


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**Richard J. Holleman**
Director of Standards Practices, IBM Corp.

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*Top Vendors of 1990*
**Will Zachmann**
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**Monday, June 9, 1986**

**9:00 am - 5:00 pm**
*Select One*

**T-1 Fundamentals of Network Control**
**Gabriel Kasperek, President, Kazcom, Inc.**
The basics of network control, including problem diagnosis and repair, maintenance and operational issues.

**T-2 Integrated Voice/Data Corporate Networks**
**Roshan Lal Sharma, Sr. Scientist/Consultant, Telecommunications Network Science.**
Network topologies and their synthesis, cost-effective network planning, future trends in intelligent networks and their impact on network management and control.

**T-3 Cost Efficient Methods for Implementing New Tariffs**
**Cheryl A. Cushing, Manager, Reference Services, Connections Telecommunications, Inc.**
Post-divestiture tariff rules, including LATAs and POPs with a comparison of major common-carrier tariffs, and evaluation of intra-LATA access alternatives and a review of new regulatory alternatives to traditional network costs.

**T-4 ISDN I**
**Samuel Lynch, Senior Consultant, Zatyko Associates.**
Definition and concepts, application standards and world-wide status, plus comparison of ISDN against OSI Reference Model as standard.

**T-5 System Network Architecture I**
**Thomas Routt, Senior Consultant, Zatyko Associates.**
Current status of IBM's communication architecture, new extensions such as LU 6.2/APPC and NETBIOS and IBM LANs as "defacto" standards.

locations to be connected over leased lines.

The bridges support 10M-bit/sec broadband, 5M-bit/sec broadband and 5M-bit/sec carrier-band media. The pricing for each bridge product begins at $10,350. The products will reportedly be available later this quarter.

Industrial Networking, Inc. (INI), a Santa Clara, Calif.-based company, unveiled a MAP Version 2.1-compatible interface unit that provides a high-speed, RS-422 serial link between factory-based MAP devices and an IEEE 802.4 broadband token-passing bus local-area network.

The MIU-40 is designed to provide MAP host computers and factory automation devices with a 56K-bit/sec link to a broadband, local net operating at 10M bit/sec.

A company spokesman said the device supports all seven layers of MAP specification version 2.1. The unit features a controller board, a 10M-bit/sec token-passing bus network modem board and INI's custom dual gate-array chip set. The MIU-40 is priced at $5,100 and is available now.

**MAPstart previewed**

Honeywell, Inc. previewed a MAP starter kit designed for factory networkers considering MAP technology for use in their facilities.

MAPstart is a hardware and software package that allows manufacturers to simulate and test MAP-compatible systems in their manufacturing laboratories using applications specific to their operations.

MAPstart contains the communications and systems software and hardware required to develop and test MAP applications.

With MAPstart, users can make as many as 32 simultaneous actual or simulated hookups with robots, programmable controllers, data collection devices, sensors and other equipment.

MAPstart will be formally announced in two to three months and is expected to cost roughly $176,000.

Fairchild Data Corp., of Scottsdale, Ariz., introduced a head-end remodulator and a MAP-compatible board level modem. The HR 8000 operates at 10M bit/sec and acts as a retransmission facility for a broadband local-area network.

The unit is compatible with the IEEE 802.4 standard for token-passing network equipment and is designed for use with MAP-compatible local nets. The HR 8000 costs $7,000 and is available immediately.

The MAP-Link M8824 modem complies with the IEEE 802.4 specification for the physical layer. It will be available in the fourth quarter at a cost of $1,795.

The new kid on the MAP block is a company by the name of Retix. Formed last year, the Santa Monica, Calif.-based company has signed agreements to supply software compatible with MAP specification Version 2.1 to Advanced Computer Communications of Santa Clara, Calif., and to Prime Computer, Inc. of Natick, Mass.


# Control Your Network

## *Control Conference and Exposition*


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**T-6 Public/Private Data Network I**
**Daniel Zatyko, President, Zatyko Associates.**
Current status of IBM's communication architecture, including applications and standards, and development of X.25 up to 1988 CCITT adoption.

**T-7 MAP/TOP Systems Interconnection I**
**Donald Harring, Vice President, Zatyko Associates.**
Status of seven layer OSI Reference Model as framework for future network compatibility, review of major vendor architecture - IBM, DEC, etc; migration to manufacturing automation and office communication protocols.

**Tuesday, June 10, 1986**

**9:00 am - 5:00 pm**
*Select One*

**T-8 Planning the Network Control Center**
**Gabriel Kasperek, President, Kazcom, Inc.**
User considerations in the design, equipment selection, software, and instrumentation of a network control center and related vendor issues.

**T-9 Problem Resolution and Network Management in SNA Networks**
**Fred Cook, Senior Consultant Kaptronix.**
Techniques useful in analyzing problems in SNA networks. Topics include detailed SNA sequences, VTAM trace, NCCF, NPDA, NLDM and a review of critical parameters in NCP System Generation.

**T-10 Network Modeling/ Design Workshop**
**Larry Rhue, Vice President, Connections Telecommunications Inc.**
Network design calculations using MNDS PC-based design software and the complimentary Borland SIDEKICK package. Also included, queuing calculations in simple and complex network models, reflecting SDLC, BSC and X.25 protocols, statistical multiplexers and distributed concentrator networks.

**T-11 ISDN II**
**Samuel Lynch, Senior Consultant, Zatyko Associates.**
Technology and system/network/switching of ISDN, and certification and network testing, including 1986/87 field trials/user implementation.

**T-12 System Network Architecture II**
**Thomas Routt, Senior Consultant, Zatyko Associates.**
Technology and systems impact of SNA and relation to open architectures and protocols on networks from DEC and other vendors, and higher layer SNA services - DIA/DCA, PU 2.1, etc.

**T-13 Public/Private Data Network II**
**Daniel Zatyko, President, Zatyko Associates.**
Technology and systems impact of long distance, regional and in-house data networks, including message handling systems and office document interchange formats under different operating systems.

**T-14 MAP/TOP Systems Interconnection II**
**Donald Harring, Vice President, Zatyko Associates.**
Session will cover MAP/TOP common protocol connectivity, GM and Boeing programs, other vendor demos, user experiences and the implications of Corporation for Open Systems on MAP/TOP, vendor standards and products.

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**Entropic** from **page 2**

the device is fully demonstrated. Chuck Irwin, area marketing engineer with ITT World Communications, Inc., Secaucus, N.J., is one of several prospective users who have heard sample speech based on a simulation of the Entropic 8000. Irwin described it as toll quality.

"I'm extremely interested in the product," Irwin said. Assuming the actual voice quality of the coder/decoder matches the simulation quality, Irwin said ITT might use the device internally and possibly to develop a low-cost voice service to Europe.

The Entropic 8000 is based on a speech-coding technique know as linear predictive coding (LPC) that is several decades old, Burg said. LPC digitizers operate by analyzing speech, creating models of voice patterns and re-creating those patterns at the receiving end. Using these principles, Entropic has developed a method of analyzing voice characteristics and transmitting only the parameters necessary to re-create natural-sounding speech, according to Burg.

The Entropic 8000 is slated to ship in the fourth quarter of 1986. A single-channel unit will be priced at$7,200, and a dual-channel unit will cost $10,900. Each voice channel output is a serial data stream of 4.8 bit/sec in synchronous or asynchronous protocols. Entropic plans to support High Level Data Link Control, Synchronous Data Link Control, bisynchronous and X.25 protocols, Prince said. Voice channels can be multiplexed with data over analog lines using modems, digital data service circuits or T-1 lines.

The coder/decoder supports all standard telephone protocols, and each protocol can be used with both pulse and touch-tone signaling. Two- and four-wire E and M trunks are supported for connection to a private branch exchange. Other protocols support connections to key telephone systems, direct central office lines and loopstart trunks to a PBX. A telephone station interface provides direct connections to the Entropic 8000.

# Calendar

**May 21-23, Amsterdam — The World Teleport Association's Second General Assembly.** Contact: World Teleport Association, One World Trade Center, Suite 63SW, New York, N.Y. 10048.

**May 21-23, Boston — Hands-On Troubleshooting of the Data Communications Network.** Also, May 28-30, Los Angeles; June 4-6, Minneapolis; June 9-11, Milwaukee; June 11-13, Denver. Contact: American Institute, 55 Main St., Madison, N.J. 07940.

**May 28-29, Boston — Planning Telecommunications Networks.** Also, Nov. 12-13, Washington, D.C.; Dec. 10-11, San Francisco. Contact: Marji Clark, International Data Corp., Washington Division, 1500 Planning Research Drive, Suite 240, McLean, Va. 22102-5096.

**May 28-30, New York — Data Network Design and Performance.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

**May 28-30, San Diego — SNA: Concepts, Design and Implementation.** Also, June 18-20, Arlington, Va.; July 9-11, Scottsdale, Ariz.; July 30-Aug. 1, Palo Alto, Calif. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

**May 30-June 2, Atlanta — The Society of Telecommunications Consultants Spring Conference.** Contact: Society of Telecommunications Consultants, One Rockefeller Plaza, Suite 1410, New York, N.Y. 10020.

**June 2-4, Boston — Hands-On Network Protocols: An Advanced Approach.** Contact: American Institute, 55 Main St., Madison, N.J. 07940.

**June 3, New York — Telecommunications Equipment and Services Selection.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

**June 3-4, Washington, D.C. — New Light on Fiber Optics: Supply & Demand Heats Up.** Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

**June 4, Bethesda, Md. — Data Communications for the IBM PC: PC to PC and PC to Mainframe Communications in One Day.** Contact: The Institute for Advanced Computer Education, 3233 K St. N.W., Washington, D.C. 20007.

**June 5-6, Orlando, Fla. — Fiber Optics in Plain English.** Also, June 25-26, Hartford, Conn.; July 16-17, Los Angeles; Aug. 6-7, Chicago. Contact: R. Skinner, Clifford, Inc., P.O. Box 51, Bethel, Vt. 05032.

**June 5-6, Bethesda, Md. — Installing and Using the IBM Token-Ring Network and other PC Lans.** Contact: The Institute for Advanced Computer Education, 3233 K St. N.W., Washington, D.C. 20007.

**June 9-10, Chicago — Computer-to-Computer: The Office Products Industry in an Electronic Age.** Contact: Communications Department, National Office Products Association, 301 N. Fairfax St., Alexandria, Va. 22314.

**June 9-10, Minneapolis — Networking IBM Personal Computers.** Also, June 11-12, St. Louis, Mo.; June 16-17, Columbus, Ohio; June 18-19, Milwaukee. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Suite 110, Santa Ana, Calif. 92705.

**June 9-11, Chicago — Network Management, Control and Problem Determination.** Also, Oct. 1-3, New York; Nov. 17-18, San Francisco; Dec. 10-12, Boston. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

**June 9-12, Boston — Network Management/Technical Control Conference and Exposition.** Contact: Registration Services, CW/Conference Management Group, Box 9171, Framingham, Mass. 01701-9171.

**June 9-13, St. Louis, Mo. — Reach for the Top in St. Louis — 23rd Annual Conference and Technical Exhibition.** Contact: Nancy Montenegro, American Society for Hospital Engineering, 840 North Lake Shore Drive, Chicago, Ill. 60611.

**June 12-13, St. Louis, Mo. — Data Communications and Networking for the IBM PC XT/AT and Other Compatibles.** Also, July 10-11, Baltimore; July 24-25, Hartford, Conn.; July 28-29, New York; Aug. 11-12, Boston. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

**June 16-18, Washington, D.C. — Fundamentals of Telecommunications: Voice, Data and Image.** Also, June 24-26, Phoenix, Ariz.; June 30-July 2, St. Louis, Mo.; July 8-10, West Palm Beach, Fla.; July 22-24, Salt Lake City, Utah. Contact: American Institute, 55 Main St., Madison, N.J. 07940

**June 19-20, Las Vegas, Nev. — Gartner Group's Fourth Annual IBM Futures Conference.** Contact: Ashley Pearce, Gartner Group, Inc., P.O. Box 10212, Stamford, Conn. 06904.

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▶ COMPARATIVE REVIEW

# Multifunctioning multiplexers

*Two flexible products that can fill a multitude of communications needs.*

**BY JOHN J. HUNTER**
Contributing Writer

The old chestnut — nothing is as constant as change — is certainly true in the telecommunications industry. Trying to anticipate change and buying equipment that can adapt to it economically are two of the biggest challenges a network manager faces.

Two products that users can easily modify to meet a variety of communications needs are Case Communications, Inc.'s Openline 81X Series and Micom Systems, Inc.'s Box 2.

These protean devices are basically statistical multiplexers that users can temporarily or permanently modify in the field to provide a wide range of services, such as multipoint communications, terminal switching and port selection and packet network interfacing. While they provide different services, both devices use firmware cartridges to alter the personality of the unit.

**Evaluate new units carefully**

Before canceling that single-function multiplexer purchase order just issued, users must evaluate these new modular devices carefully. They may not be able to live with the limited number of input channels such products offer or the limited-burst aggregate input they support.

The Case and Micom cartridges, which resemble 8-track audio cartridges, plug into the multiplexer and alter its operation from, for example, a simple point-to-point concentrator to a switching statistical multiplexer with port-sharing capabilities. To get an X.25 interface, the user inserts a different cartridge.

Micom offers four cartridges, or Featurepaks, that provide enhanced statistical multiplexing services, allow multipoint operation and packet network interfacing and permit the Box 2 to interface with other Micom networking products.

Case also uses four cartridges, called Pop-pacs, that provide enhanced statistical multiplexing and packet network interfacing, but also let users configure the unit as a switching multiplexer with port selection and dual-link facilities. Another Pop-pac provides protocol conversion services that emulate the IBM 3271/3274C controllers, 3277-2 or 3278-2 workstations and 3287 or 3288 printers.

Both the Case and Micom units accept only one cartridge at a time. However, the more powerful cartridges incorporate all the capabilities of the lesser cartridge.

The Micom Box 2 is constructed around a four-channel, character-interleaved, point-to-point statistical multiplexer with a single composite high-speed link rate of up to 9.6K bit/sec asynchronous or 19.2K bit/sec synchronous.

Each input channel handles full-duplex data rates of 50 to 9.6K bit/sec and has an automatic baud recognition facility that works with dial-in terminals. It has a 20K-byte input buffer that is shared among all terminals, and supports a burst-aggregate input of 115.2K bit/sec. All system configurations are in Cmos random-access memory (RAM) with battery backup.

A dedicated asynchronous port accepts an Ascii terminal for configuration and control. Users can also handle these operations through a built-in 24-key keypad. Users can greatly increase the capabilities of the Micom unit by adding an Enhanced Statistical Multiplexer (ESM) Featurepak cartridge. ESM supports built-in modems with autodial backup, provides channel password protection and permits users to set different speeds and protocols at each end of a channel.

An ESM-equipped multiplexer will only support one composite link, and users have the option of employing a built-in 2,400-, 4.8K- or 9.6K -bit/sec modem. ESM requires an Ascii terminal to handle the configuration and test functions.

Two other Featurepak cartridges let the Micom unit operate as a multipoint statistical multiplexer. The first, called Node, is used in the multiplexer at the terminal end. The second, the master cartridge, is located at the host end and provides polling, control services and diagnostics for up to 16 Node units.

The master cartridge also provides a form of priority message handling. It recognizes short streams of characters that typify interactive data and gives them priority over batch data.

For those requiring a packet network interface, Micom offers a packet assembler/disassembler (PAD) cartridge that lets the multiplexer interface with Telenet, Uninet, Tymnet, and other packet networks. The cartridge supports the 1980 X.25, X.3, X.28, X.29 and X.121 Consultative Committee on International Telephony and Telegraphy (CCITT) recommendations, and offers user-defined terminal profile parameters with extended X.3 support.

The last of Micom's Featurepak cartridges lets the Box 2 multiplexers interface with other Micom multiplexers.

The Case 81X Series is built around a character-interleaved statistical multiplexer base unit with nine input channel ports, one high-speed link port, one dedicated control port, and 20K bytes of shared input buffer memory. The input ports are also used to attach a second high-speed link to models 8140 and 8150.

The basic Case 8130 cartridge is much like the Micom ESM cartridge. It is a point-to-point unit that can be configured with up to nine asynchronous input channels. Each channel can be assigned a password.

Only one composite high-speed link is supported, and it handles synchronous data at up to 19.2K bit/sec, as Micom's does. However, no asynchronous transmission facility is provided.

**The case for Case**

The maximum input channel data rate of the Case unit is 19.2K bit/sec, versus 9.6K bit/sec for the Micom Box 2. Like the Micom model, automatic baud recognition is supported on each Case 8130 channel, and split-channeling is also supported. The 8130's input buffer is 20K bytes, like Micom's. However, its 86.4K bit/sec maximum burst-aggregate input does not match the Micom unit's 115.2K bit/sec.

All system configurations for the Case unit are held in battery-backed up RAM, and an Ascii terminal is required for configuration and control. Unlike the Micom unit, the Case device has no built-in keyboard.

The Model 8140 employs the same input channel types as the 8130, but can accommodate only eight input channels, since one of the ports is used to interface a second 19.2K bit/sec high-speed link. Users can independently configure and target each link to different locations, or they can use the second one for load balancing or alternate routing in a point-to-point application. Up to nine similar Case units can be cascaded to support a maximum of 72 terminals. The 8140 also uses a 20K byte input buffer, but the top aggregate input is 76.8 bit/sec. For a user operating eight terminals at 19.2K bit/sec each, the aggregate input is a little thin.

The Case Model 8150 is an 8140 configured to support terminal switching and port contention. Any authorized terminal user can switch destination ports by entering the port address.

The 8160 is like the 8130, but supports the CCITT X.25 Level 3 protocol as well as X.3, X.23, X.29 and X.121 with extensions. The 8160 lets the user employ mnemonics instead of a 14-digit X.121 address code when sending a message. For example, entering the name London causes the 8160 to translate this into the X.121 code. The user can also add a new terminal to the system by calling up one of the 20 customer-defined, named port profiles that match the terminal's interface requirements.

The final Case cartridge is the Model 8110, an upgrade that converts the multiplexer into a protocol converter. The 8110 allows Ascii terminals to communicate with an IBM host processor in 3270 BSC mode. To do this, the 8110 emulates a 3271 Model 2 or a 327 Model C cluster controller and makes the Ascii terminals appear as IBM 3277-2 or 3278-2 workstations.

Terminal profiles stored within the 8110 are the DEC VT100, IBM 3101, Lear Siegler ADM 3A, Cifer 2605 and four user-configurable profiles. Asynchronous printers can be used with the 8110, and these appear as IBM 3287-2 or 3288-2 printers. One synchronous high-speed link is supported at 19.2K bit/sec.

**Decision mode**

Neither the Case nor the Micom device handles synchronous data inputs. In addition, the 20K-byte input buffer employed by both vendors could be an impediment to throughput during heavy traffic periods. Given a top transmission rate of 19.2K bit/sec and 9.6K bit/sec per channel for Case and Micom respectively, and link speeds of 19.2K bit/sec for both products, a 20K-byte buffer could fill rapidly and issue frequent XOFF flow control signals to the terminals.

The Case 8140 can cascade up to nine units, and has a dual trunking facility that can be used for load sharing, alterate routing or for targeting each link to a different location. Micom offers no such facilities in the Box 2. Another facility not offered with Box 2 is the terminal switching and port contention afforded by the 8150.

An advantage of the 8110 is that it not only emulates IBM 3271 or 3274 C cluster controllers, but also accepts remote terminal dial-ins. The 8110 would be an even more attractive product if it had a dual-host trunking facility. This would allow it to address multiple hosts, something IBM controllers cannot do.

The Case units do not have the Micom product's multipoint facility. But the ability to operate the device with all 16 channels configured without cascading, and to have them function in a polled environment over one four-wire line makes Case's product an extremely attractive and cost-effective networking tool. Micom has also done a good job giving interactive data priority over batch inputs.

The Micom Box 2 base unit costs $1,290 and each six-channel expansion is $1,250. The ESM feature and the compatibility facility are each $200. The multipoint master node costs $300, while the slave node is $100. The packet assembly/disassembly facility costs $500. The basic Case unit costs $1,320. The 8110, 8130, 8140, 8150 and 8160 carry prices of $1,530, $880, $700, $1,790 and $1,320 respectively.

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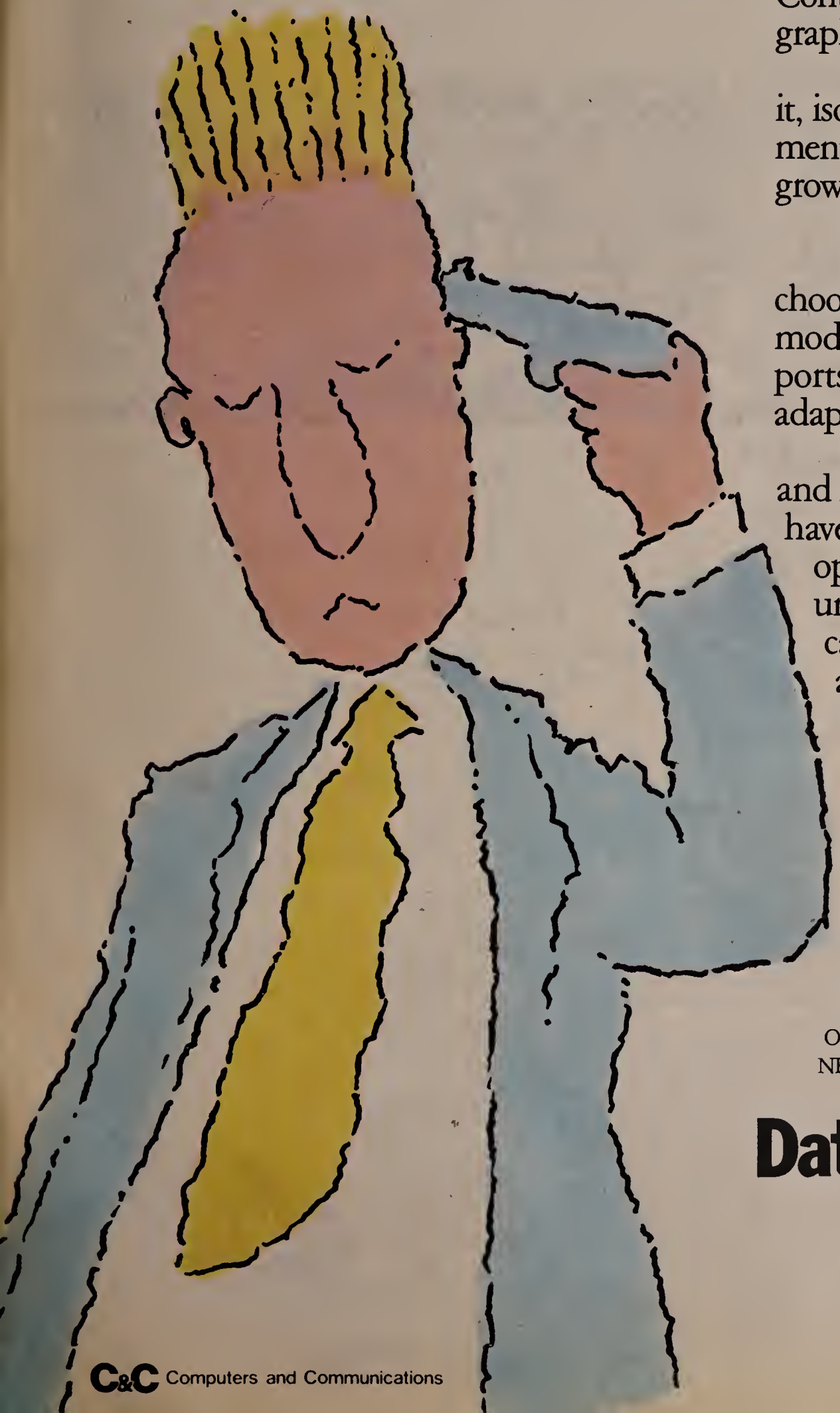
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